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NOTES ON *SINCLAIRIA* AND *LIABELLUM* IN MESOAMERICA (LIABEAE: ASTERACEAE)

Harold Robinson

Department of Botany, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560 U.S.A.

ABSTRACT

A key is provided for the eleven known Mesoamerican species of *Sinclairia*, and *S. hintoniorum* B.L. Turner is transferred to *Liabellum*.

KEY WORDS: Asteraceae, *Sinclairia*, *Liabellum*, Liabeae, Mesoamerica, key.

A treatment of the Asteraceous tribe Liabeae for the Flora Mesoamerica was prepared some years ago by the author and will appear when that flora is published. The study covers five genera, but it consists mostly of a treatment of the eleven species of *Sinclairia* occurring in the area. More recently, a revision of the genus *Sinclairia* has been published by Turner (1989a; 1989b) that treats all the species in a broadened concept of the genus. Included are species from México and members of the genus *Liabellum* that are not included in the Mesoamerican treatment. The Turner study differs in a number of details from the unpublished treatment of the present author, and a number of key characters have been missed. Because the Mesoamerican treatment is to be published in Spanish and differs from some parts of Turner's (1989a) concepts, I have decided to publish the present English version of the treatment of *Sinclairia* in Mesoamerica. A few additional notes are provided.

The two Mexican and Central American genera of the Liabeae, *Liabellum* and *Sinclairia*, are considered closely related in the recent treatments of the tribe (Robinson & Brettell 1974; Robinson 1983), and the synonymization of the two by Turner (1989a) does not violate the phyletics of the group. The species of *Liabellum* and many species of *Sinclairia* are the only members of the tribe that lack ray flowers in the heads. The large heads seen in *Sinclairia* subgenus *Megaliabum* and *Liabellum* have led Turner (1989a) to place the latter in the former group, but the character is probably ancestral to the generic pair, and the two elements may not be closely related. The branch of the subgenus *Megaliabum* with which Turner most closely associates the species of *Liabellum*

in his schema, differs from that of *Liabellum* by being mostly radiate. The present effort continues to recognize the generic distinction between *Liabellum* and *Sinclairia*, established in Robinson & Brettell (1974) and Robinson (1983). *Liabellum* shows a reduced perennially herbaceous habit from a basal tuber and has leaves sessile or winged to the base. *Sinclairia* species are larger and often scandent with distinctly petiolate leaves. A young seedling of *Sinclairia polyantha* (Costa Rica, *Funk 10077a*) has been seen with a somewhat enlarged root, but the enlargement is not as sharply demarcated, and much of its width is formed by various bulges. The fact that most *Sinclairia* species may have enlargements of the roots does not detract from the basic difference in habit between that genus and *Liabellum*. The continued acceptance of *Liabellum* as a distinct genus necessitates a transfer of one species described by Turner (1989a). Examination of an isotype (*Hinton, et al. 8482*) and a paratype (*Hinton 2038*) of *Sinclairia hintoniorum* in the U.S. National Herbarium (US) indicates that the species is distinct, and the disposition is as follows.

Liabellum hintoniorum (B.L. Turner) H. Robinson, *comb. nov.* BASIONYM: *Sinclairia hintoniorum* B.L. Turner, Phytologia 67:201. 1989.

Two additional details of difference from the Turner (1989a) treatment are worthy of a special note. The Guatemalan species *Sinclairia tajumulcensis* (Standl. & Steyerm.) H. Robins. & Bret. is now known from only the type. The species was placed in the section *Sinclairia* by Turner (1989a), but it is clearly a member of what Turner would call *Sinclairia* section *Megaliabum* with heads generally similar to those of *Sinclairia andrieuxii* (DC.) H. Robins. & Bret., except for the lack of ray flowers. Also, Turner reduces *Sinclairia dimidia* (S.F. Blake) H. Robins. & Bret. to synonymy under *Sinclairia polyantha* (Klatt) Rydb. One specimen from GUATEMALA, Dept. Izabel, *Steyermark 38200* (US), long in herbaria under the former name, is actually the latter species. Nevertheless, the type of *S. dimidia* from Tikal in GUATEMALA: Dept. Petén, *Bartlett 12602*, and three additional specimens (GUATEMALA: Dept. Santa Elena, *Tún Ortíz 1083* (US); Dept. Alta Verapaz, *J.D. Smith 1597* (US); and MÉXICO: Chiapas, *Breedlove 34987* (CAS) are distinct as indicated in the key. *Sinclairia tonduzii* (B.L. Robins.) Rydb., which Turner (1989a) places in the synonymy of *S. polyantha*, is also recognized in the present key, but the value of the distinction needs a careful review.

Key to the species of *Sinclairia* in Mesoamerica

1. Heads 15-30 mm long; involucres 12-20 mm long, densely whitish tomentose; achenes 5-7 mm long, densely sericeous setulose.

2. Heads containing 25-30 rays, 100-130 disk flowers, and 100-130 involucral bracts. ..... *S. andrieuxii*

2. Heads containing 0 rays, ca. 40 disk flowers, and ca. 40 involucral bracts. ..... *S. tajumulcensis*

1. Heads 8-15 mm long; involucres 4-11 mm long, puberulous to glabrous, without any persistent whitish tomentum; achenes 1-4 mm long, short setulose to glabrous.

3. Involucres 4-5 mm long.

4. Lower surfaces of leaves green, without whitish tomentum; heads radiate; pedicels mostly 2-10 mm long, flexuous. ..... *S. hypochlora*

4. Lower surfaces of leaves whitish tomentose; heads radiate; pedicels mostly 2-4 mm long, not flexuous.

5. Heads containing ca. 6 flowers; corollas with clustered, short, gland tipped hairs at tips of lobes; achenes with pappus of ca. 30 bristles. ..... *S. deamii*

5. Heads containing 10-12 flowers; corollas with only arachnoid hairs at lobe tips; achenes with pappus of 40-45 bristles. ..... *S. dimidia*

3. Involucres 6-11 mm long.

6. Inflorescence thyrsoid paniculate, longer than wide; heads lacking rays; involucral bracts with tips erect, not coiled backward with age.

7. Involucral bracts densely brownish puberulous on outer surface, the inner bracts with pointed tips; heads containing 30-40 flowers; leaves strictly opposite, persistent; leaf blades broadest near middle. ..... *S. sericolepis*

7. Involucral bracts without dense pubescence on outer surface, inner bracts with rounded tips; heads containing 8-15 flowers; leaves ternate or opposite, usually absent at anthesis; leaf blades broadest below basal third. ..... *S. glabra*

6. Inflorescence pyramidally paniculate, as broad as long; heads with rays; involucral bracts with tips usually strongly recurving or curling with age.

8. Leaf blades persistently pilose above, with larger hairs in addition to tomentum between veins below. .. *S. tonduzii*

8. Leaf blades essentially glabrous above, without larger hairs in addition to tomentum between veins below.

9. Leaf blades broadest at or below basal third; stems weak and with fleshy surface; inner involucral bracts often distinctly pointed. ..... *S. vagans*

9. Leaf blades usually broadest distinctly above basal third, often nearly elliptical; stems woody; tips of inner involucral bracts rounded.

10. Achenes densely setuliferous from base; stems hirsute with sparse, coarse hairs; trinervation of leaf often from 1-2 cm above base of blade; involucral bracts 1.0-1.5 mm wide. ..... *S. polyantha*

10. Achenes glabrous or with sparse setulae mostly on major ribs; stems glabrous or glabrescent, without coarse hairs; trinervation never more than 1 cm above base of blade; involucral bracts 1.0-2.5 mm wide. ..... *S. discolor*

The accepted species of *Sinclairia* in Mesoamerica are as follows: *Sinclairia andrieuxii* (DC.) H. Robins. & Brettell; *S. deamii* (B.L. Robins. & Bartlett) Rydberg; *S. dimidia* (S.F. Blake) H. Robins. & Brettell; *S. discolor* Hooker & Arnott; *S. glabra* (Hemsley) Rydberg; *S. hypochlora* (S.F. Blake) Rydberg; *S. polyantha* (Klatt) Rydberg; *S. sericolepis* (Hemsley) Rydberg; *S. tajumulcensis* (Standl. & Steyerm.) H. Robins. & Brettell; *S. tonduzii* (B.L. Robins.) Rydberg; *S. vagans* (S.F. Blake) H. Robins. & Brettell.

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NOTES ON *AGERATINA* IN MESOAMERICA (EUPATORIEAE: ASTERACEAE)

Harold Robinson

Department of Botany, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560 U.S.A.

ABSTRACT

A key is provided for the 55 species of *Ageratina* in Mesoamerica. Nine new species are described, **A. alexanderi** *sp. nov.*, **A. capillipes** *sp. nov.*, **A. guatemalensis** *sp. nov.*, **A. herrerae** *sp. nov.*, **A. hirtella** *sp. nov.*, **A. motozintlensis** *sp. nov.*, **A. subcoriacea** *sp. nov.*, **A. thomasii** *sp. nov.*, and **A. valerioi** *sp. nov.* In addition, two new combinations are made: **A. huehueteca** *comb. nov.* and **A. pichinchensis** (H.B.K.) King & H. Robins. var. **bustamenta** *comb. nov.*

KEY WORDS: Asteraceae, Eupatorieae, *Ageratina*, Mesoamerica, key.

A study of the genus *Ageratina* for the *Flora Mesoamericana* has shown the need for the following nine new species descriptions and two new combinations. Also, a preliminary English key is provided for the Mesoamerican species of *Ageratina*.

Ageratina huehueteca (Standley & Steyerm.) R.M. King & H. Robinson, *comb. nov.* BASIONYM: *Eupatorium huehuetecum* Standley & Steyerm., Publ. Field Mus., Bot. 22:304. 1940.

The species was regarded as a probable reduced form of *Ageratina bustamenta* (DC.) King & H. Robins. in the listing of species for the generic treatment of the Eupatorieae (King & Robinson 1987).

Ageratina pichinchensis (H.B.K.) King & H. Robins. var. **bustamenta** (DC.) R.M. King & H. Robinson, *comb. nov.* BASIONYM: *Eupatorium bustamentum* DC., *Prodr.* 5:168. 1836.

The Mexican and Mesoamerican variety seems to differ from the typical Andean material of *Ageratina pichinchensis*, only by the somewhat more obtuse leaf apices.

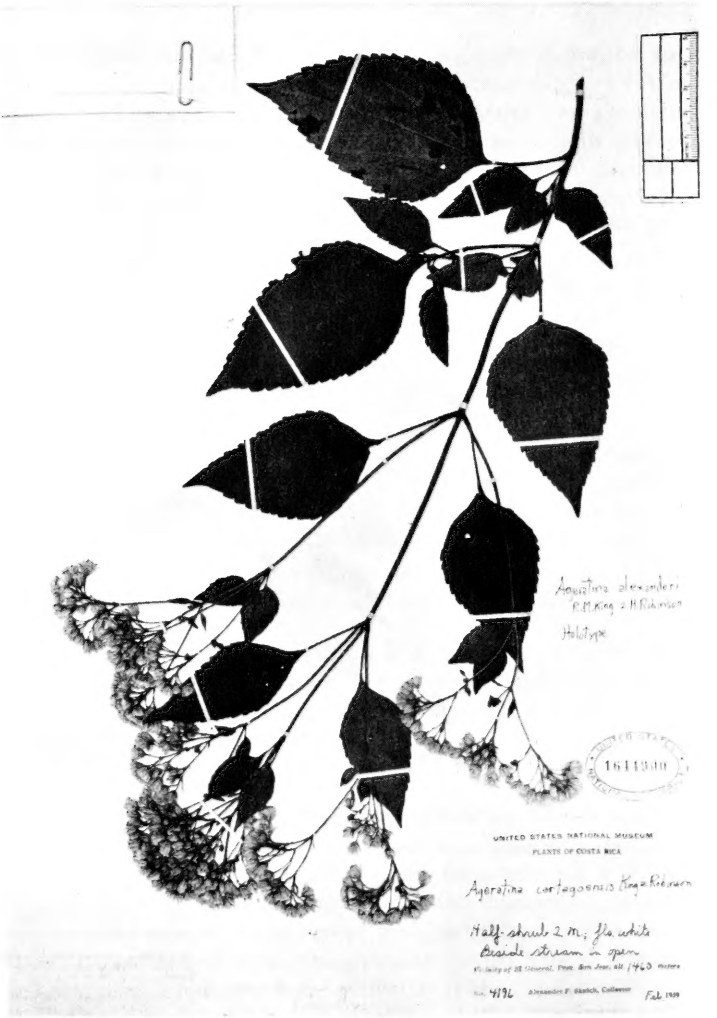
Ageratina alexanderi R.M. King & H. Robinson, *sp. nov.* (Figure 1). HOLOTYPE: COSTA RICA. San José, El General, *Skutch 4196* (US).

Plantae suffrutescentes ad 2 m altae. Caules et petioli dense rubro-puberuli. Folia opposita, petiolis plerumque 2-4 cm longis; laminae herbaceae ovatae plerumque 6-10 cm longae et 3-6 cm latae propter tertiam basilarem latissimae base obtuse rotundatae vel breviter acutae parce acuminatae margine 10-20 breviter obtuse serratae apice breviter acuminatae supra uniformiter sparse appresse puberulae subtus in nervis densius puberulae non glanduliferae 2-7 mm supra basem trinervatae, nervis a ca. 25-30° divergentibus. Inflorescentiae in caulibus foliosis terminales late corymbose cymosae, ramosis inferioribus alternis, bracteis inferioribus parve foliosis, ramulosis dense puberulis. Capitula 5-6 mm alta; bracteae involucri 15-17 eximbricatae 4-5 mm longae et 0.8-1.0 mm latae apice leniter scariosae non costatae erose breviter acutae extus puberulae. Flores ca. 25; corollae albae ca. 2.7 mm longae, tubis ca. 1.8 mm longis, faucibus ca. 1.5 mm longis, lobis ca. 0.4 mm longis extus puberulis. Achaenia ca. 2 mm longa superne et in costis setulifera; setae pappi mediocriter deciduae ca. 3 mm longae.

Material of the species was previously included among the paratypes of *Ageratina cartagoensis* King & H. Robins., but the latter species differs by its more brownish, coarsely pilosulous stems, its less widely diverging trinervation, and by the more narrowly pointed and nonerose apices of the involucral bracts.

Ageratina capillipes R.M. King & H. Robinson, *sp. nov.* (Figure 2). HOLOTYPE: GUATEMALA. Chimaltenango: road to Iximche Ruins, Tecpán, herb common on banks of Iximche Creek, alt. 2500 m. Flowers white. Jan 12-23, 1966, *A. Molina R., W.C. Burger & B. Wallenta 16080* (US). PARATYPES: MÉXICO. Chiapas: Along road from Motozintla de Mendoza to Siltepec via El Porvenir, 14.1 miles NW of Motozintla; cloud forest on steep slopes facing the Atlantic; primary forest. 1 m; flowers white. 11 Feb 1979, *T.B. Croat 47287* (MO, US).

Plantae herbaceae erectae tenues ad 1 m altae. Caules brunnei subglabri sparse appresse puberuli. Folia opposita, petiolis plerumque 1-2 cm longis; laminae oblongo-ellipticae ad ovatae tenuiter herbaceae plerumque 4-7 cm longae et 2.0-3.5 cm latae propter



Ageratina alexanderi R. M. King & H. Robinson, holotype, United States National Herbarium (US). Photos by Victor E. Krantz, Staff Photographer, National Museum of Natural History.

Figure 1. *Ageratina alexanderi* R.M. King & H. Robinson, holotype, United States National Herbarium (US). Photos by Victor E. Krantz, Staff Photographer, National Museum of Natural History.

Ageratina capillipes R. M. King & H. Robinson, holotype, United States National Herbarium.(US).

Figure 2. *Ageratina capillipes* R.M. King & H. Robinson, holotype, United States National Herbarium (US).

1/3-2/5 latissimae base breviter acutae margine 10-15 breviter univel bi-crenato-serrulatae apice mediocriter acutae supra et subtus sparse puberulae in nervis vix densius puberulae non glanduliferae 2-5 mm supra basem trinervatae, nervis secundariis a costis 15-20° divergentibus a marginis basilaribus mediocriter divergentibus. Inflorescentiae in caulibus foliosis terminales, ramulosis 5-9 mm longis minute subappresse puberulis. Capitula ca. 7 mm alta; bracteae involucri ca. 10-14 eximbricatae ca. 4-5 mm longae et 0.4-0.6 mm latae apice anguste acutae subscariosae extus glabrae vel puberulae. Flores 12-22; corollae albae ca. 4.5 mm longae, tubis ca. 1.5 mm longis, faucibus ca. 2 mm longis, lobis ca. 1 mm longis pilosulis. Achaenia 2.0-2.2 mm longa fusiformia dense setulifera; setae pappi facile deciduae ca. 3 mm longae.

The species has the tenuous habit and involucral form of *Ageratina helenae* King & H. Robins. and *A. molinae* King & H. Robins., but the leaf blades are more narrowly ovate, the trinervation is distinctly above the base and less broadly spreading, and the throat of the corolla is distinctly longer than the basal tube. Material of the species was originally distributed by the Field Museum under the name *Eupatorium* aff. *minarum* Standl. & L.O. Williams.

Ageratina guatemalensis R.M. King & H. Robinson, *sp. nov.* (Figure 3). HOLOTYPE: GUATEMALA. Quezaltenango: Slopes of Volcán de Santa María, above Palojunoj, alt. 2400-3768 m. March 6, 1939, *P.C. Standley 67608* (US).

Plantae suffrutescentes erectae ad 1.5 m altae. Caules atrescentiter rubro-brunnei sparse appresse puberuli glabrescentes. Folia opposita, petiolis 1-3 cm longis; laminae herbaceae ovatae 3-7 cm longae et 1.5-3.5 cm latae propter quartam basilarem latissimae base rotundatae vel subtruncatae margine vadose 10-20 serratae apice acutae vel breviter argute acuminatae supra inter nervam regulariter pilosae in nervis dense puberulae subtus leniter pallidiores solum in nervis pilosae non glanduliferae in acuminis basilaribus trinervatae, nervis secundariis a ca. 25° divergentibus. Inflorescentiae in caulibus foliosis terminales, ramosis dense corymbosis 2-3-stratosis, ramulis 3-9 mm longis dense puberulis. Capitula 8-9 mm alta; bracteae involucri ca. 13 eximbricatae anguste lanceolatae plerumque purpurascentes ca. 7 mm longae et 0.8-1.0 mm latae apice anguste acutae extus dense purpureo-puberulae. Flores ca. 17; corollae albae ca. 5.3 mm longae, tubis ca. 2 mm longis, faucibus ca. 2.5 mm longis, lobis ca. 0.8 mm longis extus rubropilosulis. Achaenia ca. 2.2 mm longa fusiformia in costis et inter

Ageratina guatemalensis R. M. King & H. Robinson, holotype, United States National Herbarium (US).

Figure 3. *Ageratina guatemalensis* R.M. King & H. Robinson, holotype, United States National Herbarium (US).

costas valde setulifera; setae pappi facile deciduae 4.5-5.0 mm longae.

The type specimen was originally named *Eupatorium skutchii* B.L. Robins., but the latter is a synonym of *Ageratina rivalis* (Regel) King & H. Robins., usually having black lenticular spots on the stems, broader leaf blades, less evident purplish pubescence in the heads, and setulae on the achenes restricted to the ribs. The new species has rather large heads compared to other densely corymbose species, involucral bracts with narrow tips, and very coarse setulae on the sides and ribs of the achene.

Ageratina herrerae R.M. King & H. Robinson, *sp. nov.* (Figure 4). TYPE: PANAMÁ. Bocas del Toro: Cordillera de Talamanca, headwaters of the Río Colubre, 6 airline km NW of the peak of Cerro Echandi on the Costa Rican-Panamanian international border; 9° 05′ N, 82° 50′ 30″ W; elev. 2450-2600 m. Mixed *Quercus-Podocarpus-Magnolia-Symplocus*-laurel forest with *Chusquea* understory. Along river bank. Semi-shrub 1 m tall; flowers fragrant, the florets white. 2-3 Mar 1984. *G. Davidse, L.D. Gómez, G. Herrera C., D. Chacón, I. & A. Chacón 25178* (HOLOTYPE: US; Isotype: MO). PARATYPES: PANAMÁ. Bocas del Toro: Cordillera de Talamanca, 2 airline km NW of the peak of Cerro Echandi on the Costa Rican-Panamanian international border; 9° 03′ N, 82° 50′ W; elev. 2850 m. Mixed *Quercus-Podocarpus* cloud forest in narrow canyon. Along stream. Shrub 75 cm tall; florets white with a pink tinge. 29 Feb 1984, *G. Davidse, L.D. Gómez, G. Herrera C., R. Chacón, I. & A. Chacón 25095* (MO, US); SE slopes of Cerro Echandi, between Jilguero & Danta Camps. 2600-2800 m. March 1, 1984. *L.D. Gómez, I. Chacón, G. Davidse, & G. Herrera 22279* (MO, US). Chiriquí: Path above Cerro Punta to Boquete, 8° 50′ N, 82° 30′ W. ca. 2500 m. Moist forest. Heads white. 16 March 1983, *C. Hamilton & H. Stockwell 3373* (MO, US).

Plantae suffruticosae ad 1 m altae. Caules pallide brunnescentes dense puberuli vel pilosuli. Folia opposita, petiolis plerumque 3-8 cm longis; laminae herbaceae ovatae 6-10 cm longae et 3.5-10.0 cm latae ad tertiam basilarem latissimae base vix obtusae vel subtruncatae vel late cordatae margine valde 10-20 saepe duplo crenato-serratae apice breviter late acuminatae supra et subtus inter nervis minute mediocriter puberulae in nervis dense puberulae non glanduliferae 2-5 mm supra basem trinervatae, nervis secundariis 35° divergentibus. Inflorescentiae in caulibus foliosis terminales dense late corymbosae, ramulosis dense pilosulis vel hirtellis. Capitula ca. 6 mm alta; bracteae involucri ca. 15 eximbricatae ca. 5

Ageratina herrerae R. M. King & H. Robinson, holotype, United States National Herbarium (US).

Figure 4. *Ageratina herrerae* R.M. King & H. Robinson, holotype, United States National Herbarium (US).

mm longae et 0.8-1.0 mm latae apice anguste acutae vel attenuatae herbaceae extus puberulae vel pilosulae. Flores ca. 25; corollae albae ca. 3.5 mm longae, tubis ca. 1.5 mm longae, faucibus ca. 1.5 mm longis, lobis ca. 0.4 mm longis extus pilosulis. Achaenia 1.8-2.0 mm longa superne leniter constricta superne in costis sparse scabrida; setae pappi facile deciduae ca. 3-4 mm longae.

Material of the new species was first determined as *Ageratina bustamenta* (DC.) King & H. Robins., the Central American variant of *Ageratina pichinchensis*, but the two have only superficial similarities. The new species has puberulous stems and large coarsely crenate leaf blades, and it belongs to the related group in Panamá and Costa Rica, having minutely scabrid rather than setuliferous achenes.

Ageratina hirtella R.M. King & H. Robinson, *sp. nov.* (Figure 5). HOLOTYPE: COSTA RICA. San José: along route 2, ca. 25 km S of Cartago, elev. 5700 ft. 1/2 m tall, partial shade, flowers white. June 11, 1974, *R.M. King 6755* (US). PARATYPES: COSTA RICA. San José: along route 2, 17 km generally SE of Empalme, elev. ca. 8100 ft. Shrub to 1/2 m tall, open area, flowers white. June 11, 1974, *R.M. King 6761* (US). Puntarenas: Foothills of the Cordillera de Talamanca, around Tres Colinas; 9° 07′ N, 83° 04′ W; elev. 1800-1850 m. Mixed forest with *Quercus*. *Magnolia* and *Cornus* common. Roadside; plants to 75 cm; florets white. 20 March 1984. *G. Davidse, G. Herrera Ch. & R.H. Warner 25629* (MO, US).

Plantae herbaceae erectae ad 75 cm altae. Caules pallide brunnescentes dense hirsutuli. Folia opposita, petiolis plerumque 1-2 cm longis; laminae herbaceae ovatae plerumque 4-5 cm longae et 2.5-3.5 cm latae propter tertiam basilarem latissimae base late rotundatae margine 15-20 breviter argute serrulatae apice distincte argute breviter acuminatae supra et subtus mediocriter puberulae subtus in nervis dense puberulae non glanduliferae 2-3 mm supra basem ascendentiter trinervatae, nervis secundariis a ca. 20° divergentibus. Inflorescentiae in caulibus foliosis terminales laxe thysoideae, ramis dense corymbosis, ramulosis dense pilosulis. Capitula ca. 5-6 mm alta; bracteae involucri ca. 16-18 eximbricatae ca. 5 mm longae et 0.8-1.0 mm latae apice subherbaceae acutae vel anguste acutae extus dense puberulae. Flores 29-40; corollae albae ca. 3.5 mm longae, tubis ca. 1.5 mm longis, faucibus ca. 1.5 mm longis, lobis 0.5-0.7 mm longis extus pilosulis. Achaenia ca. 2 mm longa fusiformia in costis et superne setulifera; setae pappi facile deciduae 2.5-3.5 mm longae.

Ageratina hirtella R. M. King & H. Robinson, holotype, United States National Herbarium (US).

Figure 5. *Ageratina hirtella* R.M. King & H. Robinson, holotype, United States National Herbarium (US).

The new species has a distinctive ovate leaf blade with sharp serrations and a distinct apical acumination. The inflorescence is also rather characteristically thyrsoid. The specimens were initially determined as *Ageratina bustamenta*, but the leaf tips are much more pointed and the involucral bracts are narrowly acute. The species may be closely related to *A. costaricensis* King & H. Robins., but the latter is a generally smaller plant with puberulous stems, the veins of the trinervation straighter at the base, the inflorescence less dense, and the achenes with setulae denser on the ribs.

Ageratina motozintlensis R.M. King & H. Robinson, *sp. nov.* (Figure 6). TYPE: MÉXICO. Chiapas: Municipio of Motozintla de Mendoza. Steep slope with *Pinus* and *Quercus* near summit of Cerro Moxotal, elev. 2750 m. 24 Nov 1981, *D.E. Breedlove & B. Bartholomew 55832* (HOLOTYPE: US; Isotype: CAS).

Plantae fruticosae ad 0.8 m altae. Caules brunnescentes; caules petioli laminae foliorum rami inflorescentis et bracteae involucri mediocriter vel dense rubre stipitate glanduliferae. Folia opposita, petiolis 1.0-1.3 cm longis; laminae herbaceae late ovatae plerumque 2.0-2.4 cm longae et 1.5-2.0 cm latae propter tertiam basilarem latissimae base leniter subcordatae margine breviter ca. 10 crenato-serratae apice breves acutae vel vix acuminatae supra regulariter glandulo-piliferae subtus leniter pallidiores in nervis densius glanduliferae non glandulo-punctatae ad basem trinervatae, nervis secundariis ad angulos 40-50° divergentes. Inflorescentiae in caulibus foliosis terminales, ramulis plerumque 9-13 mm longis. Capitula ca. 8 mm alta; bracteae involucri ca. 20 eximbricatae plerumque 5-6 mm longae et ca. 0.9 mm latae apice anguste acutae rubescentes in bracteis interioribus plus scariosae. Flores ca. 30; corollae albae ca. 4.5 mm longae, tubis 1.5 mm longis, faucibus ca. 2 mm longis, lobis 1.0-1.2 mm longis extus sparse puberulis. Achaenia ca. 2.2 mm longa fusiformia in costis dense setulifera inter costas subglabra; setae pappi facile deciduae pallide lavandulae plerumque ca. 4 mm longae.

The new species resembles *Ageratina rhypodes* (B.L. Robins.) King & H. Robins., and may have its closest relationship to that Andean species. Both show the indument of reddish stipitate glands on the stems, leaves, inflorescence branches and involucre. The Andean species is most distinct in its strongly cordate leaf bases with a central acumination, and by the trinervation being basal and marginal in that basal acumination.

Ageratina motozintlensis R. M. King & H. Robinson, holotype, United States National Herbarium (US).

Figure 6. *Ageratina motozintlensis* R.M. King & H. Robinson, holotype, United States National Herbarium (US).

Ageratina subcoriacea R.M. King & H. Robinson, *sp. nov.* (Figure 7). HOLOTYPE: MÉXICO. Chiapas: Municipio of La Trinitaria. Slope with *Liquidambar, Quercus* and *Pinus* at the Lago of Monte Bello, 25 miles east of La Trinitaria, elev. 5100 ft. Flowers white, 3 feet tall. 13 April 1965, *D.E. Breedlove 9741* (DS).

Plantae fruticosae erectae ad 3 m altae. Caules pallide brunnescentes subcarnosi sparse minute appresse pilosi. Folia opposita, petiolis 2-6 cm longis; laminae subcoriaceae late ovatae plerumque 5.5-10.5 cm longae et 3-8 cm latae propter tertiam basilarem latissimae base late obtusae vel subtruncatae margine valde serratae ad duplo-serratae apice breviter acuminatae supra sparse minute puberulae subtus non glandulo-punctatae in axillis nervis subtomentosae 5-10 mm supra basem trinervatae, nervis secundariis a 30-40° divergentibus, nervulis subtus reticulatis atrescentibus non prominulis. Inflorescentiae caulibus foliosis terminales dense late corymbosae, ramulis puberulis non stipitate glanduliferae. Capitula ca. 9-10 mm alta; bracteae involucri 20-25 eximbricatae oblongo-lanceolatae 8-9 mm longae et 0.5 mm latae apice longe attenuatae extus puberulae. Flores 30-50; corollae albae, ca. 5.3 mm longae, tubis 2.0-2.5 mm longis, faucibus ca. 2.2 mm longis, lobis ca. 0.8 mm longis et ca. 0.4 mm latis extus non pilosis. Achaenia ca. 3.5 mm longa base leniter angustiora in costis et superne plerumque breviter setulifera non glandulifera; setae pappi mediocriter deciduae ca. 4.5 mm longae.

The new species is a member of the subgenus *Neogreenella* in the group containing *Ageratina mairetiana* (DC.) King & H. Robins., but it differs from most species in the group by having setulae rather than glands on the achenes. The species seems most closely related to *Ageratina ernstii* King & H. Robins. from Oaxaca, but the pedicels and involucre lack stipitate glands, the leaves are more coriaceous, and the inflorescences are more compact.

Ageratina thomasii R.M. King & H. Robinson, *sp. nov.* (Figure 8). TYPE: MÉXICO. Chiapas: Along road between Motozintla de Mendoza and Siltepec via El Porvenir, 13 miles NW of Motozintla, elev. 1580 m. Less than 1 m; flowers white. 11 Feb 1979, *Thomas B. Croat 47279* (HOLOTYPE: US; Isotype: MO).

Plantae erectae parve fruticosae ad 0.5 m altae. Caules primarii pallide brunnescentes subcarnosi glabri, ramis sparse puberulis. Folia opposita, petiolis plerumque 3-8 mm longis; laminae ovatae 1.5-3.5 cm longae et 1-2 cm latae propter tertiam basilarem latissimae base obtusae margine 3-7 obtuse serratae apice

Ageratina subcoriacea R. M. King & H. Robinson, holotype, United States National Herbarium (US).

Figure 7. *Ageratina subcoriacea* R.M. King & H. Robinson, holotype, United States National Herbarium (US).

Ageratina thomasii R. M. King & H. Robinson, holotype, United States National Herbarium (US).

Figure 8. *Ageratina thomasii* R.M. King & H. Robinson, holotype, United States National Herbarium (US).

breviter acutae supra et subtus subglabrae in nervis majoribus et margine sparse minute puberulae non glandulo-punctatae 1-6 mm supra basem trinervatae, nervis secundariis ad angulos ca. 30° divergentibus, nervulis non distincte reticulatis. Inflorescentiae in ramis terminales corymbosae; corymbis parvis 10-20 capitatis, ramulis puberulis non glanduliferis. Capitula ca. 6 mm alta; bracteae involucri 12-16 eximbricatae oblongo-ellipticae ca. 3.5 mm longae et ca. 0.8 mm latae apice acutae extus subglabrae. Flores ca. 20; corollae ca. 3.8 mm longae, tubis 1.5 mm longis, faucibus late campanulatis ca. 1.5 mm longis, lobis ca. 0.8 mm longis et ca. 0.4-0.5 mm latis extus non pilosis. Achaenia ca. 1.5 mm longa base angustiora in costis et superne breviter setulifera; setae pappi 2-3 mm longae mediocriter deciduae.

The new species is a member of subgenus *Neogreenella* with some resemblance to the rather scandent *Ageratina ovilla* (Standl. & Steyerm.) King & H. Robins., but there is no indication of a scandent habit. Also, the lateral branches spread at more nearly 45° rather than at right angles. The involucral bracts are also shorter and are greatly exceeded by the florets in the mature heads.

Ageratina valerioi R.M. King & H. Robinson, *sp. nov.* (Figure 9). HOLOTYPE: COSTA RICA. Cartago: Along the Río Reventado, north of Cartago, alt. 1460-1650 m. Moist thicket; erect bushy herb 3 ft.; flowers white. Feb. 26, 1926, *P.C. Standley & J. Valerio 49493* (US).

Plantae herbaceae erectae ad 0.8 m altae. Caules pallidi vel mediocriter brunnescentes hirsuti. Folia opposita, petiolis 1.5-3.5 cm longis; laminae membranaceae ovatae plerumque 6-10 cm longae et 3-6 cm latae propter tertiam basilarem latissimae base rotundatae vel breviter obtusae et leniter acuminatae margine supra tertiam basilarem breviter 10-20 crenato-serrulatae apice breviter late acuminatae supra et subtus minute puberulae non glanduliferae in nervis densius puberulae 2-5 mm supra basem trinervatae, nervis secundariis ad 20-25° divergentibus. Inflorescentiae in caulibus foliosis terminales dense pyramidaliter paniculatae, ramulis dense puberulis vel hispidulis. Capitula ca. 5 mm alta; bracteae involucri ca. 13 eximbricatae 3.5-4.0 mm longae et 0.6-0.8 mm latae ad 7/8 costatae apice obtuse erosae tenuiter scariosae extus puberulae. Flores 25-30; corollae albae ca. 3.7 mm longae; tubis ca. 1.5 mm longis, faucibus ca. 1.5 mm longis, lobis ca. 0.7 mm longis extus pilosulis. Achaenia ca. 1.5 mm longa fusiformia in costis superne dense setulifera et inter costas superne sparse setulifera; setae pappi facile deciduae ca. 3 mm longae.

Ageratina valerioi R. M. King & H. Robinson, holotype, United States National Herbarium (US).

Figure 9. *Ageratina valerioi* R.M. King & H. Robinson, holotype, United States National Herbarium (US).

The species is one of those in Costa Rica having elliptic-ovate leaves with strongly ascending lateral veins of the trinervation. The type specimen of the new species was cited as a paratype of *Ageratina cartagoensis* (King & Robinson 1972) but the latter as presently defined differs by the coarse curved pilosity of the stems and the narrowly acute tips of the involucral bracts. The new species is also similar to *A. alexanderi*, described above, but the latter has puberulous stems, more ovate leaf blades, and a more broadly corymbose inflorescence.

Key to the species of *Ageratina* in Mesoamerica

1. Corollas with lobes as long as throat: pappus rather persistent, spreading with age: lower leaf surface much paler than upper, membranaceous, loosely attached except at major veins. .....5. *A. anisochroma*

1. Corolla throats longer than lobes; pappus erect or deciduous with age: lower leaf surface firmly attached to most veins of leaf.

2. Leaf blades with no strongly ascending veins diverging at less than 45° from midrib.

3. Leaves with numerous glandular punctations.

4. Involucral bracts with numerous stipitate glands; achenes with small glandular dots; leaf blades with no basal auricles. ... 12. *A. caeciliae*

4. Involucral bracts without stipitate glands; achenes with no glands, with only setulae; leaf blades usually with lobes and strongly recurved margins at bases. .....29. *A. ligustrina*

3. Leaves without glandular punctations.

5. Leaves sessile; stems glabrous; florets ca. 6 in a head. 17. *A. contigua*

5. Leaves petiolate; stems puberulous; florets 20-30 in a head.

6. Heads with 20-22 florets. .....48. *A. subglabra*

6. Heads with 28-30 florets. .....52. *A. tonduzii*

2. Leaf blades with some veins in lower third ascending at less than 45° divergence from midrib, often strongly trinervate; leaf blades usually widest distinctly below middle.

7. Peduncles of inflorescence and also often involucral bracts with numerous, distinctly stipitate glands.

8. Achenes glabrous or glanduliferous.

9. Achenes glabrous; leaves trinervate from top of petiole; heads 4-5 mm high; corollas with abruptly narrowed basal tube. ..... 1. *A. adenophora*

9. Achenes glanduliferous; leaves usually trinervate from point above base of blade; heads 7-12 mm high; corollas without abruptly narrowed basal tube. ..... 39. *A. pringlei*

8. Achenes setuliferous or scabrid, without glands.

10. Leaves in basal rosette. ..... 10. *A. bellidifolia*

10. Leaves cauline.

7. Peduncles and involucral bracts without stipitate glands, sometimes with sessile or nearly sessile glandular dots.

11. Petioles less than 1.5 cm long; leaf blades usually less than 5 cm long, trinervate from base of blade.

12. Stems, leaves, and involucre with numerous, reddish, stipitate glands; involucre with ca. 20 bracts. ..... 33. *A. motozintlensis*

12. Hairs of stems, leaves, and involucre not reddish; involucre with 13-16 bracts.

13. Leaves subsessile, the petioles 1-2 mm long. .16. *A. chiriquensis*

13. Leaves with petioles 0.7-1.3 cm long. ..... 28. *A. kupperi*

11. Petioles 1-7 cm long; leaf blades over 5 cm long, trinervate from above base of blade.

14. Leaf blades deltate, veinlets not forming a minute dark reticulum. ..... 55. *A. zunilana*

14. Leaf blades ovate, veinlets as seen from below forming a minute dark reticulum.

15. Leaves and stems densely velutinous. ..... 54. *A. vernalis*

15. Leaves and stems glabrous to minutely puberulous.

16. Corollas without a tuft of hairs on lobes, and without a sharply delimited basal tube. ..... 26. *A. intibucensis*

16. Corollas with apical tuft of hairs on lobes, with sharply delimited slender basal tube. ..... 27. *A. ixiocladon*

17. Scrambling shrubs with branches of inflorescence spreading at 90° angles; heads with 8-10 florets.

18. Leaves serrate, secondary veins parallel to basal margin, veinlets prominulous on both surfaces; achenes glabrous or minimally scabrid above. ..... 41. *A. reticulifera*

18. Leaves subentire, secondary veins divergent from basal margin, veinlets not prominulous; achenes hispid above. ..... 35. *A. ovilla*

17. Erect herbs, shrubs, or trees with ascending branches in inflorescence; heads with 12 or more florets.
    19. Achenes glabrous or glanduliferous, essentially without setulae or scabrae.
        20. Achenes glanduliferous; stems, young leaves, and axils of large secondary veins on leaf undersurface with appressed, arachnoid tomentum. ..... 30. *A. mairetiana*
        20. Achene glabrous, without glands.
            21. Leaf blades elliptical with long-acuminate bases and tips; secondary veins strongly ascending in 3-4 pairs, heads ca. 6 mm high, with ca. 13 involucral bracts. ..... 11. *A. burgeri*
            21. Leaf blades ovate with short-acuminate bases and tips; trinervate from near base; heads ca. 4 mm high, with ca. 20 involucral bracts. ..... 31. *A. malacolepis*
    19. Achenes distinctly setuliferous or scabrid on ribs or upper surfaces.
        22. Corollas with few or no hairs on outer surfaces of lobes; leaf surface sometimes with obvious glandular dots.
            23. Leaves without glandular dots below; stem and leaf surfaces glabrous to subglabrous or with sparse, appressed pubescence.
                24. Leaf blades 1.5-3.5 cm long, 1-2 cm wide, undersurface without a close reticulum of veinlets; inflorescences small with 10-20 heads; heads ca. 6 mm high, with 12-16 involucral bracts. ..... 50. *A. thomasii*
                24. Leaf blades 3.5-7.0 cm long, mostly 2-6 cm wide, undersurface with a close reticulum of veinlets; inflorescences large with 50 or more heads; heads 8-10 mm high, with 18-25 involucral bracts.
                    25. Veinlets of leaf blades forming a prominulous, close reticulum on both surfaces; leaf margins subserrulate; heads with ca. 17 florets. ..... 43. *A. salvadorensis*
                    25. Veinlets of leaf blades with the reticulum not prominulous; leaf margins serrate; heads with 30-50 florets. ..... 47. *A. subcoriacea*
            23. Leaves with numerous glandular dots below; stems and leaf surfaces with distinct, usually erect pubescence.
                26. Leaf base deeply cordate, trinervate from base of blade. ..... 37. *A. petiolaris*
                26. Leaf base obtuse to scarcely cordate, trinervate from above base of blade.

27. Leaf tips acute to short-acuminate; stems hirsute to tomentose, often with reddish hairs. ..... 49. *A. subinclusa*

27. Leaf tips rounded; stems grayish or yellowish pubescent. ..... 51. *A. tomentella*

22. Corollas with numerous long hairs on outer surfaces of lobes; surfaces of leaf blades with only obscure glandular pits or without glands.

28. Heads with usually 20-24 involucral bracts 1-2 mm wide, with 50-125 florets; plants herbaceous, mostly 30-80 cm tall, often with enlarged basal leaves; inflorescence scapose or subscapose.

29. Stems distinctly reddish; heads 6-9 mm long; leaf margins with 4-12 blunt or coarse crenations or serrations; achenes 2.2-2.7 mm long; involucre puberulous, peduncles densely puberulous to pilosulous. ..... 40. *A. prunellaefolia*

29. Stems brownish with at most a reddish tinge; heads 4-6 mm long; leaf margins with 10-20 crenations or blunt serrations; achenes ca. 1.5 mm long; involucre glabrous; peduncles glabrous to sparsely puberulous.

30. Inflorescence laxly branching with few heads per branch, peduncles to 7.5 cm long; leaf blades ovate to orbicular, usually cuneate to truncate at base; leaves confined to lower 1/4 of plants. ..... 34. *A. muelleri*

30. Inflorescence moderately lax with numerous heads, peduncles short; leaf blades cordate; reduced leaves extending well up stem into inflorescence. ..... 4. *A. anchistea*

28. Heads with usually 10-16 involucral bracts 0.3-1.0 mm wide, with rarely more than 45 florets; plants subshrubs to shrubs without evident basal leaves; inflorescence terminal on leafy stems.

31. Corollas with numerous hairs inside at bases of lobes. ..... 46. *A. subcordata*

31. Corollas without evident hairs inside at bases of lobes.

32. Involucral bracts with small sessile glands on outer surface, sometimes viscid, without nonglandular hairs except at margin. ..... 27. *A. iziocladon*

32. Involucral bracts without glands, with few to many nonglandular hairs.

33. Achenes with only scabrae or short spicules that are 1-3 times as long as wide, not longer than space between them; plants restricted to Costa Rica and Panamá.

34. Bases of leaf blades acute, strongest secondary veins located well above base near basal 1/3 of blade.
    35. Stems puberulous; leaf blades minutely puberulous, areoles without internal vesicular inclusions. ..... 3. *A. allenii*
    35. Stems hirsute; leaf blades pilose, areoles with internal vesicular inclusions. ..... 9. *A. barbensis*
34. Bases of leaf blades rounded to broadly obtuse or subcordate, strongest secondary veins arising within 5 mm of blade base.
    36. Leaf blades broadest near basal 1/4, tips narrowly acuminate; heads ca. 4 mm long. ... 19. *A. croatii*
    36. Leaf blades broadest near basal 1/3, tips short acute to short acuminate; heads ca. 6 mm long.
        37. Stems and leaves antrorsely or appressed puberulous; throats of corollas ca. 1.5 mm long, longer than wide; leaf margins coarsely crenate-serrate. ..... 23. *A. herrerae*
        37. Stems and leaves hispid with erect pubescence; throats of corollas ca. 1 mm long, almost as wide as long; leaf margins minutely serrulate or crenulate. ..... 45. *A. standleyi*
33. Achenes with long setulae on ribs or upper surfaces, setulae many times as long as wide, distinctly longer than distances between them; species from all parts of Mesoamerica.
    38. Tips of involucral bracts obtuse to shortly acute, often broadly scarious and erose.
        39. Stems hirsute or hispid with erect hairs.
            40. Base of leaf blade rounded to slightly cordate, blade herbaceous in texture. .38. *A. pichinchensis* var. *bustamenta*
            40. Base of leaf blade acute with short acumination, blade membranaceous in texture. ..... 53. *A. valerioi*
        39. Stems puberulous with short curved or appressed hairs.
            41. Stems reddish or reddish tinged.
                42. Leaf margins with 5-10 blunt serrations, blades usually 2-5 cm long. ..... 44. *A. schaffneri*

42. Leaf margins with 10-20 sharp, single or double serrations, blades usually 4-9 cm long. .....36. *A. pazcuarensis*

41. Stems brownish, not reddish.

43. Leaf blades oblong ovate to nearly elliptical, basal margins subparallel to basal secondary veins; heads ca. 4 mm long. 25. *A. huehueteca*

43. Leaf blades ovate to broadly ovate, basal margins strongly divergent from secondary veins in trinervation; heads 5-7 mm long.

44. Base of trinervation at margin of large distinct basal acumination of leaf blade, blade broadest in basal 1/5-1/4; achenes with setulae only slightly denser on ribs. .....6. *A. atrocordata*

44. Base of trinervation arising from 1-7 mm above base of leaf blade, blade widest near basal 1/4-1/3; achenes with setulae mostly on ribs, often sparse or lacking between.

45. Stems without black lenticular spots; base of leaf blade subacute to acute; setulae not densely pectinate on ribs of achene; leaf margins with 10-20 broad teeth. .....2. *A. alexanderi*

45. Stems usually with obvious black lenticular spots; base of leaf blade often subtruncate to cordate; setulae densely pectinate on ribs of achene; margins of most leaves with 20-30 close teeth. .....42. *A. rivalis*

38. Tips of involucral bracts mostly narrowly acute to attenuate.

46. Achenes with setulae mostly or entirely restricted to ribs, sometimes dense.

47. Secondary veins in trinervation of leaves divergent from basal margin, at ca. 20° angle from midvein; stems coarsely curved pilosulous. .....15. *A. cartagoenesis*

47. Secondary veins in trinervation of leaves nearly parallel to basal margin, at ca. 30-35° angle from midvein; stems with spreading hairs.

48. Stems and leaves with reddish hairs; internodes 1-3 cm long; corolla lobes with hairs dimorphic, some hairs ending in a series of short broad cells. .....20. *A. diversipila*

48. Stems and leaves with whitish or sordid hairs, not reddish; internodes mostly 6-9 cm long; corolla lobes with all hairs slender tipped. .....7. *A. austin-smithii*

46. Achenes with setulae rather evenly distributed on ribs and upper surfaces.

49. Stems densely hirtellous or hirsutulous with erect hairs.

50. Leaf blades mostly 4-5 cm long, trinervate from 1-3 mm above base, margins with short sharp teeth; hairs of stem pale. 24. *A. hirtella*

50. Leaf blades mostly 8-10 cm long, trinervate from 7-15 mm above base, margins with numerous blunt serrations; hairs of stems reddish. .....8. *A. badia*

49. Stems puberulous with curved or appressed hairs.

51. Leaf blades over 3/4 as wide as long, secondary veins at base of trinervation diverging from midvein at 30-35° angle at base; heads 4-5 mm long.

52. Corolla tube 1.5-2.0 mm long, distinctly longer than the limb; trinervation of leaf basal, at margin in basal acumination. 32. *A. molinae*

52. Corolla tube 1.0-1.5 mm long, about as long as limb; trinervation arising slightly above base of blade, intramarginal in basal acumination. ..... 22. *A. helenae*

51. Leaf blades 1/2-3/4 as wide as long, secondary veins of trinervation diverging from midvein at 15-25° angle; heads 5-9 mm long.

53. Petioles 3-7 cm long; leaf blades distinctly and narrowly acuminate at base; peduncles 2-5 mm long. .....14. *A. carmonis*

53. Petioles 1.5-3.0 cm long; leaf blades acute to subtruncate at base; peduncles 3-12 mm long.

54. Base of leaf blade subacute to acute, broadest near 1/3-2/5; involucral bracts with pale or sordid hairs or nearly glabrous. ..... 13. *A. capillipes*

54. Base of leaf blade subtruncate, broadest near basal 1/4; involucral bracts with reddish hairs.

55. Heads 8-9 mm long; leaf margins with 10-15 small serrations; stems mostly 3-4 mm thick. ....21. *A. guatemalensis*

55. Heads ca. 6 mm long; leaf margins with 5-10 sometimes coarse serrations; stems slender, mostly ca. 2 mm thick. .....18. *A. costaricensis*

The previously described and combined Mesoamerican species of *Ageratina* with their authorities are as follows:

Ageratina adenophora (Spreng.) King & H. Robins. (including *Eupatorium glandulosum* H.B.K.), *A. allenii* (Standl.) King & H. Robins. (including *A. whitei* King & H. Robins.), *A. anchistea* (Grashoff & Beaman) King & H. Robins., *A. anisochroma* (Klatt) King & H. Robins. (including *Eupatorium durandii* Klatt, *E. adspersum* Klatt, and *E. polyanthum* Klatt), *A. atrocordata* (B.L. Robins.) King & H. Robins. (including *A. fosbergii* King & H. Robins.), *A. austin-smithii* King & H. Robins., *A. badia* (Klatt) King & H. Robins., *A. barbensis* King & H. Robins., *A. bellidifolia* (Benth.) King & H. Robins., *A. burgeri* King & H. Robins., *A. caeciliae* (B.L. Robins.) King & H. Robins. (including *Eupatorium vetularum* Standl. & Steyerm.), *A. carmonis* (Standl. & Steyerm.) King & H. Robins., *A. cartagoensis* King & H. Robins., *A. chiriquensis* (B.L. Robins.) King & H. Robins., *A. contigua* King & H. Robins., *A. costaricensis* King & H. Robins., *A. croatii* King & H. Robins. (including *A. almedae* King & H. Robins.), *A. diversipila* King & H. Robins., *A. helenae* King & H. Robins., *A. intibucensis* King & H. Robins., *A. ixiocladon* (Benth. *in* Örsted) King & H. Robins., *A. kupperi* (Suesseng.) King & H. Robins., *A. ligustrina* (DC.) King & H. Robins., *A. mairetiana* (DC.) King & H. Robins., *A. malacolepis* (B.L. Robins.) King & H. Robins., *A. molinae* King & H. Robins., *A. muelleri* (Schultz-Bip. *ex* Klatt) King & H. Robins., *A. ovilla* (Standl. & Steyerm.) King & H. Robins., *A. pazcuarensis* (H.B.K.) King & H. Robins., *A. petiolaris* (DC.) King & H. Robins., *A. pichinchensis* (H.B.K.) King & H. Robins. var. *bustamenta* (DC.) King & H. Robins. (including *Eupatorium aschenbornianum* Schauer, *E. vulcanicum* Benth. *in* Örsted and *E. donnell-smithii* Coult.), *A. pringlei* (B.L. Robins. & Greenm.) King & H. Robins., *A. prunellaefolia* (H.B.K.) King & H. Robins., *A. reticulifera*

(Standl. & L.O. Williams) King & H. Robins., *A. rivalis* (Greenm.) King & H. Robins. (including *Eupatorium skutchii* B.L. Robins.), *A. salvadorensis* King & H. Robins., *A. schaffneri* (Schultz-Bip. *ex* B.L. Robins.) King & H. Robins., *A. standleyi* King & H. Robins., *A. subcordata* (Benth. *in* Örsted) King & H. Robins., *A. subglabra* King & H. Robins., *A. subinclusa* (Klatt) King & H. Robins. (including *Eupatorium subpenninervium* Schultz-Bip. *ex* Klatt, *E. melanolepis* Schultz-Bip. *ex* Klatt, and *E. monticola* L.O. Williams), *A. tomentella* (Schrad.) King & H. Robins., *A. tonduzii* (Klatt) King & H. Robins., *A. vernalis* (Vatke & Kurtz) King & H. Robins. (including *Eupatorium chiapense* B.L. Robins.), *A. zunilana* (Standl. & Steyerm.) King & H. Robins.

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NOTES ON *CRITONIA* IN MESOAMERICA (EUPATORIEAE: ASTERACEAE)

Harold Robinson

Department of Botany, National Museum of Natural History,
Smithsonian Institution, Washington, D.C. 20560 U.S.A.

ABSTRACT

A key is presented for the fifteen species of *Critonia* in Mesoamerica, **C. wilburii** *sp. nov.* is described as new from Panamá, and a new combination is provided for **C. yashanalensis** *comb. nov.*

KEY WORDS: Asteraceae, Eupatorieae, *Critonia*, Mesoamerica, key.

A study of the genus *Critonia* for the Central American area has been completed for eventual inclusion in a treatment of the Eupatorieae in the Flora Mesoamerica to be published in Spanish. The present paper is provided to describe a new Panamanian species of the genus that has been discovered and to offer an English version of the key to the species of the area. One new combination is also provided for a species described by Whittemore (1988).

Among the specimens seen from Panamá that would key in the *Flora of Panamá* treatment (King & Robinson 1975) to *Critonia billbergiana* (Beurl.) King & H. Robins., are actually three distinct species. *Critonia billbergiana* itself seems to occur only along the Atlantic coast in that country, although the same species also occurs in Guatemala, Chiapas, Honduras, and Belize, where it has been called *C. magistri* (L.O. Williams) King & H. Robins. In western Panamá, at higher elevations near Volcán Chiriquí, there are specimens of the mostly Costa Rican *C. laurifolia* (B.L. Robins.) King & H. Robins. The third species, from inland in central Panamá, is described herein as follows:

Critonia wilburii R.M. King & H. Robinson, *sp. nov.* (Figure 1). TYPE: PANAMÁ. Prov. Panamá: slopes of Cerro Jefe between Cerro Azul and La Eneida, about 15 miles northeast of Panamá City. Sprawling woody vine. 30 Dec 1971, *R.L. Wilbur, F. Almeda & J. Luteyn 15546* (HOLOTYPE: US). PARATYPES: PANAMÁ. Prov. Coclé, road to Coclesito. Logging camp 12 mi from Llano Grande. Alt. 200 m. 8° N, 80° W. Vine; flowers white. 9 Dec 1983, *H.W. Churchill, A. Lier, W.S. Hambruster, & A. Herzig 4007* (MO, US).

Critonia wilburii R. M. King & H. Robinson, holotype, United States National Herbarium (US). Photo by Victor E. Krantz, Staff Photographer, National Museum of Natural History.

Figure 1. ***Critonia wilburii*** R.M. King & H. Robinson, holotype, United States National Herbarium (US). Photos by Victor E. Krantz, Staff Photographer, National Museum of Natural History.

Plantae scandentes lignosae sparse ramosae; caules teretes sparse puberuli vel glabri non fistulosi. Folia opposita, petiolis 1-2 cm longis; laminae ovatae plerumque 5-7 cm longae 1.8-3.5 cm latae base obtusae margine serrulatae apice breviter acuminatae supra et subtus puberulae vel subglabrae trinervatae, nervis secundariis ad marginem basilarem parallelibus, maculis pellucidis obscuris. Inflorescentiae anguste pyramidaliter paniculatae, internodis primarius elongatis, ramis dense puberulis vel pilosulis. Capitula sessilia vel subsessilia 2-3 in fasciculis 9-10 mm alta; involucra brevia; bracteae involucri ca. 30 subimbricatae 1-5 mm longae late ovatae vel oblongae apice rotundatae vel obtusae extus glabrae. Flores 8-10 in capitulo; corollae anguste infundibulares ca. 6.5 mm longae glabrae, lobis ca. 1 mm longis anguste triangularibus; appendices stylorum distaliter leniter latiores. Achaenia ca. 3.5 mm longa base leniter angustiora glabra vel superne breviter persparse setulifera; setae pappi 35-45 ca. 7 mm longae apice distincte lateriores.

The new species has the same habit as *Critonia billbergiana*, and also has the heads with 10 flowers and the leaves without obvious internal pellucid pockets. The species differs by its solid stems, the pubescent branches of its inflorescence, and the shorter involucre that scarcely reaches half the length of the head. The head form was that represented in the illustration of *C. billbergiana* in the Flora of Panamá (King & Robinson 1975).

Critonia yashanalensis (Whittemore) R.M. King & H. Robinson, *comb. nov.* BASIONYM: *Eupatorium yashanalense* Whittemore, Sida 13:77. 1988.

This species from Chiapas, México seems close to *Critonia conzattii* (B.L. Robins.) King & H. Robins. from farther west, in Oaxaca, but the stems are less angled, as noted by Whittemore (1988), and the trinervation of the leaves reaches the distal fourth of the blade with only slight interruption.

Key to the species of *Critonia* in Mesoamerica

1. Stems densely villous; heads 5 mm wide or wider, with ca. 20 flowers. ..... *C. lanicaulis*

1. Stems flocculose pubescent or pilose to glabrous; heads 2-4 mm wide, with 4-12 flowers.

2. Slender woody vines; leaf blades broadly ovate to broadly elliptical, 5-12 cm long.
   3. Heads with 8-11 flowers; leaf areoles usually without evident pellucid dots when seen against light.
      4. Stems narrowly fistulose; branches of inflorescence subglabrous; involucre more than two thirds as long as the head. .... *C. billbergiana*
      4. Stems with solid pith; branches of inflorescence puberulous or pilosulous; involucre about half as long as the head. ..... *C. wilburii*
   3. Heads with 4-6 flowers; leaf areoles usually with small pellucid dots when seen against light.
      5. Inflorescence branches corymbose with heads all pedicellate; smaller stems with solid pith; stems whitish. ..... *C. campechensis*
      5. Inflorescence branches bearing many sessile heads in fascicles; all stems usually narrowly fistulose; stems light brown.
         6. Primary leaves with shortly acute to obtuse and apiculate leaf tips; achenes with sparse long antrorse setulae above; at elevations below 1000 m. ..... *C. bartlettii*
         6. Primary leaves with narrowly acuminate tips; achenes with numerous short spreading setulae above; at elevations above 1000 m. ..... *C. laurifolia*

2. Erect or reclining coarse herbs, shrubs, or small trees; leaf blades large and ovate or lanceolate, mostly 10 to 25 cm long.
   7. Stems greenish to yellowish, usually fistulose, often coarsely tetragonal or hexagonal.
      8. Heads with ca. 5 flowers; pappus bristles not enlarged at tips; stems and leaves glabrous. ..... *C. sexangularis*
      8. Heads with ca. 10 flowers; pappus bristles with slightly but distinctly enlarged tips; stems and leaves with some flocculose or arachnoid pubescence.
         9. Petioles mostly or completely unwinged; stems terete to slightly hexagonal, not speckled with linear spots, with evanescent floccose pubescence. ..... *C. morifolia*
         9. Petioles winged completely to base; stems weakly to strongly quadrangular, speckled with numerous linear spots, glabrous or with thin arachnoid pubescence. ..... *C. quadrangularis*
   7. Stems brownish, with solid pith, usually terete or subhexagonal.
      10. Leaf blades with 1-4 strong secondary veins ascending at less than 45° angles from the midrib; areoles with mostly rounded pellucid spots; heads with short pedicels.

11. Leaf blades trinervate from the base, veins reaching distal fourth of blade, without tufts of tomentum in axils; panicle broadly and laxly corymbose. ..... *C. yashanalensis*

11. Leaf blades trinervate or with ascending secondary veins from well above the base, with tufts of tomentum in axils; panicle densely pyramidal or cylindrical.

12. Margin of leaf blades with projecting angle near basal third; inflorescence a small, cylindrical thyrsoid panicle; heads 13-15 mm high; achenes densely long setuliferous on sides and ribs; pappus with ca. 50 bristles. ..... *C. iltisii*

12. Margin of leaf blades elliptical without angle; inflorescence a broad pyramidal panicle; heads ca. 8 mm high; achenes with short setulae on sides, glabrous on the pale ribs; pappus with ca. 25 bristles. ..... *C. hebebotrya*

10. Leaf blades regularly pinnately veined with 5-9 secondary veins spreading from the midrib at more than 45°; areoles with distinct pellucid lines and dots; heads mostly sessile in fascicles.

13. Heads with ca. 10 flowers; pappus ca. 6 mm long, with 30-36 bristles. ..... *C. nicaraguensis*

13. Heads with ca. 5 flowers; pappus 3-4 mm long, with 25-30 bristles.

14. Branches of inflorescence with dense spreading puberulence; style branches only slightly broadened distally. ..... *C. daleoides*

14. Branches of inflorescence subglabrous or sparsely appressed puberulous; style branches distinctly thickened distally.

15. Stems terete or subhexagonal; leaf tips narrowly acuminate; corollas funnelform, with short lobes ca. 0.5 mm long and 0.5 mm wide; achenes scabrid mostly on ribs; pappus bristles narrowed below the broadened tips. ..... *C. breedlovei*

15. Stems hexagonal with 6 ribs; leaf tips slightly short acuminate; corollas tubular with lobes nearly twice as long as wide; achenes with long setulae on sides and ribs; pappus broad from the base. ..... *C. tuxtlae*

The authorities for the 13 species not described or combined in this paper are as follows: *Critonia bartlettii* (B.L. Robins.) King & H. Robins., *C. billbergiana* (Beurl.) King & H. Robins., *C. breedlovei* King & H. Robins., *C. campechensis* (B.L. Robins.) King & H. Robins., *C. daleoides* DC., *C. hebebotrya* DC., *C. iltisii* King & H. Robins., *C. lanicaulis* (B.L. Robins.) King & H. Robins. (incl. *C. belizeana* B.L. Turner), *C. laurifolia* (B.L. Robins.) King & H. Robins., *C. morifolia* (Miller) King & H. Robins., *C. nicaraguensis* (B.L.

Robins.) King & H. Robins., *C. quadrangularis* (DC.) King & H. Robins., *C. sexangularis* (Klatt) King & H. Robins. (incl. *Eupatorium sotorum* C. Nelson), and *C. tuxtlae* King & H. Robins.

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Whittemore, A.T. 1988. New taxa of *Eupatorium* sect. *Dalea* (Compositae: Eupatorieae). Sida 13:77-81.

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NOTES ON *AGERATUM* IN MESOAMERICA (EUPATORIEAE: ASTERACEAE)

Harold Robinson

Department of Botany, National Museum of Natural History,
Smithsonian Institution, Washington, D.C. 20560 U.S.A.

ABSTRACT

A key is provided for the 25 species of *Ageratum* credited to Mesoamerica. Four new species are described, **Ageratum hondurense** *sp. nov.*, **A. molinae** *sp. nov.*, **A. munaense** *sp. nov.*, and **A. tehuacanum** *sp. nov.*

KEY WORDS: Asteraceae, Eupatorieae, *Ageratum*, Mesoamerica, key.

Four new species are described that are needed for a treatment of the genus *Ageratum* in the Flora Mesoamerica. A preliminary English version of a key to the Mesoamerican species of *Ageratum* is also provided. The final version of the flora with its key will be published in Spanish.

Ageratum hondurense R.M. King & H. Robinson, *sp. nov.* (Figure 1). TYPE: HONDURAS. Morazán: Cerro de Hule, 20 km south of Tegucigalpa, open pine forest, El Chorrito, alt. 1500 m. Heads violet, herb 0.5-1 m. Oct. 27, 1966, *A. Molina R. 18466* (HOLOTYPE: US; Isotype: F). PARATYPES: HONDURAS. Morazán: El Chorrito, Cerro de Hule, 20 km south of Tegucigalpa, common in open pine forest and wet meadow, alt. 1500 m. Fls. lilac-violet, plant 0.5-1 m. Oct. 27, 1966, *A. Molina R. 18462* (F, US); Choluteca: Between El Chinchayote and Comalí, thickets along Panamerican highway, common on moist bank, alt. 1100 m. Heads bluish or lavender, herb 1-1.5 m. Nov. 9, 1969, *A. Molina R. & A.R. Molina 24582* (F, US).

Plantae suffruticosae erectae 0.5-1.0 m altae, multo ramosae. Caules virides vel rubescentes sparse vel dense puberuli. Folia opposita, petiolis 4-20 mm longis; laminae ovatae plerumque 3-6 cm longae 1.8-3.5 cm latae base obtusae vel subtruncatae margine

Ageratum hondurense R. M. King & H. Robinson, holotype, United States Herbarium (US). Photos by Victor E. Krantz, Staff Photographer, National Museum of Natural History.

Figure 1. *Ageratum hondurense* R.M. King & H. Robinson, holotype, United States National Herbarium (US). Photos by Victor E. Krantz, Staff Photographer, National Museum of Natural History.

crenulatae apice breviter acutae supra obscure virides breviter pilosulae sparse vel non glandulo-punctatae subtus leniter pallidiores dense glandulo-punctatae tenuiter minute puberulae 5 mm supra basem trinervatae; folia superiora mediocriter decreascentia et remotiora. Inflorescentiae in fasciculis ultimis aliquantum dense corymbosae, ramis basilaribus lateralibus oppositis quam axis apicalibus plerumque distincte brevioribus. Capitula 5-6 mm alta inferne abrupte rotundata; bracteae involucri ca. 25 eximbricatae lineares ca. 4 mm longae et 0.5-0.7 mm latae margine non distincte scariosae apice in bracteis interioribus angustae et curvatae omnino extus leniter puberulae sparse glandulo-punctatae; receptacula epaleacea. Corollae ca. 2.5 mm longae extus parvae pilosulae et plerumque inferne sparse glandulo-punctatae, tubis mediocriter latis ca. 1 mm longis. Achaenia ca. 1.8 mm longa glabra; pappus coroniformis denticulatus ad 0.2 mm altus.

The type specimen was originally distributed by the Field Museum under the name *Ageratum corymbosum* Zuccag., a Mexican species with coarsely pubescent leaves and larger heads. Relationship is closer to *A. rugosum* Coulter, which has denser erect pubescence on the leaf undersurfaces and has basal lateral branches of the inflorescence usually as long as the central part.

Ageratum molinae R.M. King & H. Robinson, *sp. nov.* (Figure 2). HOLOTYPE: HONDURAS. Morazán: Km. 54 de Zambrano, frecuente en el bosque abierto. alt. 1500 m. Fls. lilas, planta hasta 0.5 m. Junio 28, 1964, *A. Molina R. 14412* (US).

Plantae herbaceae perennes erectae ad 0.5 m altae, inferne leniter ramosae; caules brunnescentes hispiduli. Folia opposita, petiolis 2-4 mm longis; laminae oblongo-ovatae 2.5-3.5 cm longae et 1.0-1.5 cm latae base breviter acutae margine crenulatae apice breviter acutae supra leniter rugulosae lucidae pilosulae, pilis in basis persistentibus, cellulis in diametro ad 0.1 mm, subtus leniter pallidiores glandulo-punctatae in areolis membranaceae in nervis hispidulae fere ad basem trinervatae. Folia superiora mediocriter decreascentia. Inflorescentiae aliquantum dense corymbosae, ramis oppositis basilaribus quam axis terminalibus, brevioribus ramulis ca. 1 mm longis. Capitula 4-5 mm alta inferne abrupte rotundata; bracteae involucri ca. 22 lineares 2.5-3.0 mm longae, ca. 0.5 mm latae, margine anguste scariosae apice anguste acutae leniter curvatae extus breviter pilosulae sparse glandulo-punctatae; receptacula epaleacea. Flores 25-30 in capitulo; corollae lilacinae 2 mm

Ageratum molinae R. M. King & H. Robinson, holotype, United States National Herbarium (US).

Figure 2. *Ageratum molinae* R.M. King & H. Robinson, holotype, United States National Herbarium (US).

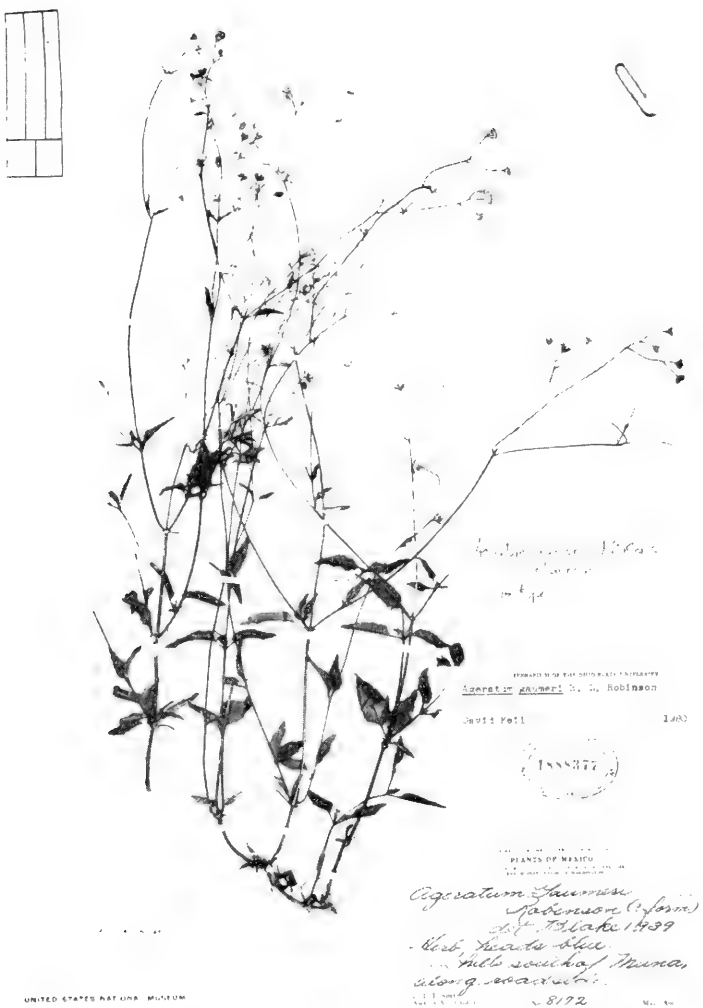
longae extus plerumque in tubis glandulo-punctatae, tubis mediocriter latis ca. 1 mm longis. Achaenia ca. 1.5 mm longa glabra; pappus coroniformis ad 0.3 mm altus.

The type specimen was originally distributed by the Field Museum under the name *Ageratum corymbosum*, and has been annotated more recently as *A. standleyi* B.L. Robins. Both of the latter species have more pubescent leaves, and *A. corymbosum* is a more robust species, restricted to México, beyond the Mesoamerican range. The new species is actually closer to *A. hondurense* in most characters, but is different by the erect hairs on the lower internodes of the stem and the veins of the lower leaf surface, by the blunt tips of the involucral bracts, and by unusually large cells of the upper leaf surface.

Ageratum munaense R.M. King & H. Robinson, *sp. nov.* (Figure 3). HOLOTYPE: MÉXICO. Yucatán: Hills south of Muna, along roadside. Herb; heads blue. May-Aug. 1938, *C.L. Lundell & A.A. Lundell 8172* (US).

Plantae herbaceae subperennes erectae base decumbentes 0.3-0.4 m altae in et supra basem mediocriter ramosae; radices fibrosae vel adventitiae; caules rubescentes sparse minute puberuli. Folia opposita, petiolis 3-5 mm longis; laminae leniter carnosae ovatae, 1.5-2.5 cm longae, 0.5-1.0 cm latae, base obtusae margine crenulatae apice acutae supra et subtus in nervis minute puberulae subtus pallidiores et minute glandulo-punctatae base trinervatae. Folia superiora mediocriter decreascentia et leniter remotiora. Inflorescentiae laxe diffusae, ramis rigide divergentibus, pedicellis plerumque 5-20 mm longae, bracteolis subulatis ca. 1 mm longis. Capitula 4 mm alta inferne abrupte rotundatae; bracteae involucri ca. 18 oblongo-ovatae, 2.7-3.0 mm longae, ca. 0.8 mm latae, margine late scariosae apice rigide acutae erectae extus glabrae; receptacula epaleacea. Flores ca. 25 in capitulo; corollae ca. 1.8 mm longae in basis et lobis minute puberulae, tubis ca. 0.4 mm longis. Achaenia ca. 1.5 mm longa glabra vel subglabra; pappus nullus.

The type specimen has been previously identified as *Ageratum gaumeri* B.L. Robins. and as the variety *fallax* B.L. Robins. of that species. Both species are in the same group with short basal tubes on the corollas. However, the new species is closest to *A. lundellii* King & H. Robins., which has the same form of long, stiff, diverging pedicels. The reddish stems and the smaller, more carnose leaf blades in the new species might be differences from *A. lundellii*, expected of a plant growing in a more exposed habitat. The decumbent bases



Ageratum munaensis R. M. King & H. Robinson, holotype, United States National Herbarium (US).

Figure 3. *Ageratum munaense* R.M. King & H. Robinson, holotype, United States National Herbarium (US).

of the stems and the basal trinervation of the leaf blades in the new species furnish additional distinctions.

Ageratum tehuacanum R.M. King & H. Robinson, *sp. nov.* TYPE: MÉXICO. Puebla: 9 km NW of San Lorenzo on the Tehuacán-Tecamachalco highway (No. 150). Limestone rock outcrop with low shrubs and *Yucca* prominent: elev. 1600 m. Florets blue. 6 Aug 1975, *G. & J. Davidse 9308* (HOLOTYPE: US; Isotype: MO). PARATYPES: MÉXICO. Oaxaca: Valley of Oaxaca, alt. 5100-5800 ft. Sept. 8, 1894, *E.W. Nelson 1213* (US); Puebla: Limestone hills near Tehuacán, 5200 ft. 30 July, *Pringle 9522* (US); near Tehuacán, Aug. 1 & 2, 1901, *J.N. Rose & R. Hay 5877* (US); Barren hills about Esperanza, alt. 2660 m, Aug. 17, 1905, *H. Pittier 434* (US); Near Tehuacán, Aug. 30 to Sept. 8, 1905, *J.N. Rose, J.H. Painter, J.S. Rose 10161* (US); Sierra de la Yerba, vicinity of San Luis Tultitlanapa, Aug 1907, *C.A. Purpus 2547* (US); Mountains along route 125, ca. 7 miles north of Puebla-Oaxaca border. Occasional, up to 1/2 meter tall; open sun, dry sandy soil; flowers blue. 28 July 1960, *R.M. King 3548* (US); Veracruz: Lepinziana, Orizaba, dry sunny limestone hills, Sept. 1857, *Botteri & Mohr 911* (US); Mt. Orizaba, Maltrata, 5500 ft. Aug. 15, 1891, *H.E. Seaton 346* (US).

Plantae erectae perennes plerumque 0.4-0.5 m altae mediocriter ramosae in radice palari; caules brunnei vel rubescentes dense albo-puberuli vel pilosuli. Folia opposita, petiolis plerumque 0.8-2.0 cm longis; laminae ovatae plerumque 2.5-5.0 cm longae et 1.5-3.5 cm latae, base obtusae, margine crenatae apice breviter acutae supra virides dense puberulae subtus dense albo-tomentosae et sub tomentis glandulo-punctatae 1-2 mm supra basem trinervatae. Inflorescentiae scaposae plerumque sine ramis infernis subopositis vel alternis, glomerulis ultimis dense corymbosis paucicapitatis. Capitula campanulata 6-7 mm alta inferne abrupte rotundata; bracteae involucri ca. 25, anguste oblongo-lanceolatae, ca. 5 mm longae et 0.7-1.0 mm latae, margine anguste scariosae, apice breviter rigide acutae extus dense albo-pilosulae; receptacula interdum in parte paleaceae. Flores ca. 50 in capitulo; corollae azureae 3.0-3.5 mm longae, extus plerumque dense glandulo-punctatae, tubis ca. 1 mm longis, lobis extus pauce vel multo pilosulis. Achaenia 2.0-2.5 mm longa glabra; pappus coroniformis denticulatus ad 0.4 mm altus.

The new species is what has been identified as *Ageratum tomentosum* (Benth. *in* Örst.) Hemsl. by most taxonomists (Robinson 1913; Johnson 1971), but the type of the latter, kindly loaned by Kew, matches a different species known from eastern Chiapas and central Guatemala. The true *A. tomentosum*

has shorter petioles, smaller and less densely clustered heads, narrower involucral bracts with curved narrow tips, and has no evident pappus. The type of *A. tomentosum* is cited from Candelaria, supposedly in Costa Rica, but that locality has been questioned by Johnson (1971) since no recent material of the genus with tomentose lower leaf surfaces is known from south of Honduras. Neither *A. tomentosum*, as presently delimited, nor *A. tehuacanum* is known closer to Costa Rica than Guatemala.

The short-acute involucral bracts and the slender, whitish tipped paleae of *Ageratum tehuacanum* are like those of other paleaceous species of *Ageratum* in México, but none of the latter have dense tomentum on the leaf undersurface. Johnson (1971) emphasized the taprooted nature of the species, a character that seems potentially very useful in the genus, but there are too many species in which the root character has not been recorded. Johnson established *A. tomentosum* var. *bracteosum* on the basis of some paleaceous specimens of the present species, but the presence of paleae seems limited and erratic in the species.

Key to the species of *Ageratum* in Mesoamerica

1. Receptacles with stiff paleae throughout cluster of florets.
   2. Leaves ovate to lanceolate, with base of blade abruptly narrowed into distinct petiole; with spreading trinervation. .....5. *A. elassocarpum*
   2. Leaves elliptical to linear, with base of blade gradually narrowed into indistinct petiole; with trinervate veins becoming longitudinal above.
      3. Lower internodes and leaf bases strongly hirsute with coarse, large celled hairs. .....4. *A. echioides*
      3. Internodes and leaf bases pilosulous to puberulous with slender hairs or subglabrous. ..... 20. *A. platylepis*
1. Receptacles epaleaceous or with bracts inside only outermost florets.
   4. Basal tube of corolla short, 0.5 mm long or less; inflorescence diffuse, sparsely branched.
      5. Pappus often present; lower internodes hirsute with coarse, large celled hairs; branches of inflorescence with few laxly ascending branches, with numerous linear bracts.
         6. Involucre ca. 3 mm high; leaf blades somewhat carnose; pappus when present, of numerous short scales. .....13. *A. maritimum*
         6. Involucre ca. 2 mm high; leaf blades strictly herbaceous; pappus when present, usually of 5 subulate scales. ..... 7. *A. gaumeri*

5. Pappus absent; lower internodes puberulous to pilosulous with fine hairs; branches of inflorescence stiffly diverging, with shortly ovate to lanceolate bracts.
   7. Stems reddish; leaf blades ca. 2-3 cm long, trinervate from base. ..... 16. *A. munaense*
   7. Stems brownish; leaf blades mostly 6-8 cm long, trinervate from distinctly above base. ..... 12. *A. lundellii*

4. Basal tube of corolla 0.8 mm long or longer; inflorescence with some congested clusters of heads.
   8. Lower stems densely hirsute with coarse, large celled hairs and puberulous with few to many small hairs; outer surfaces of involucral bracts glabrous or pilose, never glanduliferous, hispidulous or tomentose.
      9. Pappus lacking or shortly coroniform; sides of achenes without setulae, glabrous or slightly scabrid.
         10. Involucral bracts glabrous, with entire, herbaceous margins; basal tube of corolla with few or no minute glands. ..... 17. *A. oerstedii*
         10. Involucral bracts usually pilose or pilosulous, with scarious, sometimes erose margins; basal tube of corolla with powdery cover of many minute stipitate glands. ..... 14. *A. microcarpum*
      9. Pappus of 5 separate, usually long subulate scales; sides of achenes setuliferous.
         11. Corollas ca. 1.7 mm long; style branches filiform with blunt papillae forming 1/4 of width, usually pale. ..... 3. *A. conyzoides*
         11. Corollas ca. 2.3-3.0 mm long; style branches slightly broader distally, with small, pointed papillae, bluish. .... 10. *A. houstonianum*
   8. Stems not hirsute with coarse, large celled hairs, with only smaller hairs of more uniform size; outer surfaces of involucral bracts sometimes glanduliferous, hispidulous or tomentose.
      12. Plants maritime or from lower elevations; glandular punctations lacking; involucre often weakly rounded and not abrupt below, bracts mostly subulate with stiff tips; pappus when present, of 5 long subulate, separate scales.
         13. Leaf surfaces and pedicels with sparse pilosity; leaf blades broadly elliptical. ..... 6. *A. ellipticum*
         13. Leaf surface and pedicels subglabrous with few hairs or glabrous; leaf blades narrowly elliptical or linear to ovate.
            14. Leaf blades narrowly elliptical to linear, thickly carnose on veins; involucre tapering or slightly rounded at base; achenes strongly setuliferous. ..... 18. *A. peckii*

14. Leaf blades usually ovate to rhombic ovate, thinly carnose with narrow, often sparsely puberulous veins; achenes with few or no setulae, even in pappiferous forms. ..... 11. *A. littorale*

12. Plants not maritime, from elevations above 500 meters; obvious glandular dots present on leaves; involucre strongly, abruptly rounded below, bracts often linear, oblong, or broadly lanceolate with short or flexuous tips; pappus formed of a continuous crown or short lobes.

15. Leaf blades lanceolate, more than three times as long as wide; trinervation becoming longitudinal; glands of leaf undersurface usually deeply recessed in pits. ..... 1. *A. chiriquense*

15. Leaf blades ovate, less than three times as long as wide; trinervation not becoming longitudinal above; leaf undersurface with emergent or scarcely recessed glandular dots.

16. Involucres without glands, glabrous or pilosulous; leaf surfaces sparsely pilose, never densely velutinous or tomentose; roots fibrous or adventitious on procumbent bases; species of Nicaragua, Costa Rica, or Panamá.

17. Involucral bracts lanceolate, 0.8-1.2 mm broad, with pubescence mostly on distal margins or median outer surface; petioles 2-10 mm long; pappus never with bristles. ..... 21. *A. riparium*

17. Involucral bracts linear, 0.8 mm wide or less, with numerous hairs on outer surface; petioles up to 40 mm long; achenes with pappus often bearing a long bristle. ..... 19. *A. petiolatum*

16. Involucre often with glands; leaf surface sometimes densely velutinous or tomentose; roots often from tubers or taproots; species of El Salvador, Honduras, Guatemala, or México.

18. Undersurfaces of leaves with hairs densest on veins, not totally obscuring green surface of areoles.

19. Branching of inflorescence alternate or unequal at base, lateral branches mostly longer than central axis; petioles 1-4 mm long. ..... 8. *A. guatemalense*

19. Branching of inflorescence usually opposite and equal at base; petioles up to 20 mm long.

20. Leaf undersurface pilosulous with mostly erect hairs; basal lateral branches of inflorescence as long as central axis. ..... 22. *A. rugosum*

20. Leaf undersurface finely and sparsely appressed puberulous; basal lateral branches of inflorescence shorter than central axis.

21. Lower internodes and veins of leaf undersurfaces with erect hairs; involucral bracts with blunt tips. ..... 15. *A. molinae*

21. Lower internodes and veins of leaf undersurfaces with appressed hairs; involucral bracts pointed. ..... 9. *A. hondurense*

18. Undersurfaces of leaves with whitish tomentum lying over areoles and obscuring green leaf surface.

22. Petioles 5-20 mm long; involucres mostly 5 mm high, shortly and stiffly acute; with taproot. ..... 24. *A. tehuacanum*

22. Petioles 2-5 mm long; involucres mostly 4 mm high, with narrow, curved tips; base sometimes with tuber.

23. Leaf blades without glandular dots on upper surface; trinervation at 3-8 mm above base of leaf blade, with weaker secondary veins below trinervation. ..... 2. *A. chortianum*

23. Leaf blades usually with glandular dots on upper surface; trinervation at 0-2 mm above base of leaf blade, without weaker secondary veins below trinervation.

24. Upper surface of leaves densely hirtellous, with mostly erect hairs; stems grayish with spreading hairs. ..... 25. *A. tomentosum*

24. Upper leaf surface puberulous with reclining hairs to nearly glabrous; stems puberulous with ascending hairs. ..... 23. *A. standleyi*

The names and authorities of *Ageratum* species previously known from the Mesoamerican area are as follows: *Ageratum chiriquense* (B.L. Robins.) King & H. Robins., *A. chortianum* Standl. & Steyerm., *A. conyzoides* L., *A. echioides* (Less.) Hemsl. (incl. *Coelestina isocarphioides* DC.), *A. elassocarpum* S.F. Blake (incl. *A. nelsonii* [B.L. Robins.] M.F. Johnson), *A. ellipticum* B.L. Robins., *A. gaumeri* B.L. Robins., *A. guatemalense* M.F. Johnson, *A. houstonianum* Miller (incl. *A. mexicanum* Sims and *Alomia pinetorum* L.O. Williams), *Ageratum littorale* A. Gray (incl. *A. intermedium* Hemsl.), *A. lundellii* King & H. Robins., *A. maritimum* H.B.K., *A. microcarpum* (Benth. *in* Örsted) Hemsl., *A. oerstedii* B.L. Robins. (incl. *Coelestina latifolia* Benth. *in* Örsted., *A. oliveri* King & H. Robins.), *A. peckii* B.L. Robins. (incl. *A. radicans* B.L. Robins.), *A. petiolatum* (Hook. & Arn.) Hemsl. (incl. *Coelestina scabrius-*

cula Benth. *in* Örsted, *Ageratum reedii* King & H. Robins.), *A. platylepis* B.L. Robins. (incl. *Alomia guatemalensis* B.L. Robins., *Ageratum benjamin-lincolnii* King & H. Robins.), *A. riparium* B.L. Robins. (incl. *A. rivale* B.L. Robins., *non* Sessé & Moçiño, *A. panamense* B.L. Robins.), *A. rugosum* Coult. (incl. *A. elachycarpum* B.L. Robins., *Alomia wendlandii* B.L. Robins., and *Alomia robinsoniana* L.O. Williams), *Ageratum standleyi* B.L. Robins. *in* Standley, *A. tomentosum* (Benth. *in* Örsted) Hemsl.

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NEW COMBINATIONS IN THE ASTERACEAE (VERNONIEAE, HELIANTHEAE, MUTISIEAE)

Harold Robinson

Department of Botany, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560 U.S.A.

ABSTRACT

New combinations are provided for six species of three tribes of the Asteraceae, **Critoniopsis calerana** *comb. nov.*, **Critoniopsis sodiroi** *comb. nov.*, **Cyanthillium cordifolia** *comb. nov.*, **Cyanthillium polytrichotoma** *comb. nov.* of the Vernonieae, **Oblivia simplex** *comb. nov.* of the Heliantheae, and **Acourtia mexicana** *comb. nov.* of the Mutisieae.

KEY WORDS: Asteraceae, Vernonieae, Heliantheae, Mutisieae, new combinations.

The following combinations are needed primarily for specimen identifications and some eventually are for use in future publications.

Critoniopsis sodiroi (Hieron.) H. Robinson, *comb. nov.* BASIONYM: *Piptocarpha sodiroi* Hieron. *ex* Sodiro, Bot. Jahrb. Syst. 29:2. 1900.

Vernonia pichinchensis Cuatr., Bot. Jahrb. Syst. 77:76. 1956. *Critoniopsis pichinchensis* (Cuatr.) H. Robins., Phytologia 46:440. 1980.

This species, which had been misplaced in the genus *Piptocarpha*, proves to be an older name for *Vernonia pichinchensis* Cuatr. The species is distinctive in *Critoniopsis* by its opposite or subopposite leaves.

Critoniopsis calerana (Cuatr.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia calerana* Cuatr., Not. Syst. Paris 15(2):238. 1956.

This species was overlooked at the time the genus was resurrected (Robinson 1980). Two additional combinations have been made for Venezuelan species by Badillo (1983).

Cyanthillium cordifolium (Benth. *ex* Oliv.) H. Robinson, *comb. nov.* BASIONYM: *Gutenbergia cordifolia* Benth. *ex* Oliv., Trans. Linn. Soc. London 29:89, t. 55. 1873. *Erlangea cordifolia* (Benth. *ex* Oliv.) S. Moore. J. Linn. Soc. Bot. 35:313. 1901.

Cyanthillium polytrichotoma (Wechuysen) H. Robinson, *comb. nov.* BASIONYM: *Gutenbergia polytrichotoma* Wechuysen, Bull. Jard. Bot. État. 51:107. 1981.

A recent effort to make needed combinations in *Cyanthillium* (Robinson 1990) was prepared before the author made a detailed study of some new east African collections of the species usually called *Erlangea cordifolia*. The species is part of the reason the present author has often regarded *Erlangea* as a close relative of *Cyanthillium*. In the study of east African Vernonieae by Jeffrey (1988), the species and its close relatives are treated under the genus in which the species was first described, *Gutenbergia* Schultz-Bip. Review of the revised generic concept of Jeffrey indicates that *Gutenbergia* is indistinguishable from the older genus *Cyanthillium*. Only two of the combinations are needed at this time, but any future monographer should consider synonymization of the genus and make the appropriate transfers of species epithets.

Oblivia simplex (Badillo) H. Robinson, *comb. nov.* BASIONYM: *Otopappus simplex* Badillo, Bol. Soc. Venez. Ci. Nat. 10:311. 1946. *Zexmenia simplex* (Badillo) Hartman & Stuessy, Syst. Bot. 8:209. 1983.

Strother (1989) has established the genus *Oblivia* to contain an element in northern South America that was correctly recognized in the unpublished thesis of Rindos (1980) as a relative of *Otopappus*, but which lacks the definitive character of the latter genus (Hartman & Stuessy 1983). Strother mentioned the Badillo species but seemed uncertain of its status. The species has more florets in the heads than the type of the genus, *Oblivia mikanioides* (Britton) Strother, and the rays are apparently not fused to the achenes, but the relationship is clearly with *O. mikanioides*. *Otopappus simplex* was originally described from Venezuela, but a collection from Ecuador (*Cerón 6411* [MO, US]) has been seen.

Acourtia mexicana (Lag. *ex* D. Don) H. Robinson, *comb. nov.* BASIONYM: *Proustia mexicana* Lag. *ex* D. Don., Trans. Linn. Soc. London 16:201. 1830.

Perezia thurberi A. Gray, Mem. Amer. Acad. Arts., ser. 2, 5:324. 1854. *Acourtia thurberi* (A. Gray) Reveal & R.M. King, Phytologia 27:231. 1973.

Perdicium mexicanum Sessé & Moçiño, *Pl. Nov. Hisp.* 139. 1890.

A photograph of original material (México, *Sessé & Moçiño*, G-DC [photo US]) and Don's description (1830) indicate the involucral bracts are pointed rather than blunt. Therefore, *Proustia mexicana* is an older name for *Perezia thurberi*, as Gray himself suspected, and not a synonym of *Acourtia reticulata* (Lag. *ex* D. Don) A. Gray, as indirectly indicated by McVaugh (1984). The various names for the species date back to the early Nineteenth Century, but the Don validation of the Lagasca name seems to be the first.

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NOTES ON VARIATION IN THE *MACHAERANTHERA PINNATIFIDA* COMPLEX (ASTERACEAE) IN MÉXICO WITH A NEW COMBINATION

Guy L. Nesom

Department of Botany, University of Texas, Austin, Texas 78713 U.S.A.

ABSTRACT

Four varieties of *Machaeranthera pinnatifida* (Hook.) Shinners are accepted for the Mexican plants of that species, although the taxa are here characterized somewhat differently from the 1976 study by Turner & Hartman. The var. *incisifolia* (I.M. Johnston) Turner & Hartman is elevated to specific status as **M. incisifolia** *comb. nov.*; it is a morphologically distinctive and nonintergrading taxon geographically isolated on islands of the Baja Californian Gulf, and situated roughly at the juncture between the ranges of *M. pinnatifida* var. *gooddingii* (A. Nels.) Turner & Hartman and var. *scabrella* (E. Greene) Turner & Hartman.

KEY WORDS: *Machaeranthera*, Asteraceae, Astereae, México.

Turner & Hartman (1976) summarized their observations on infraspecific variation in the widespread *Machaeranthera pinnatifida* (Hook.) Shinners as an "abbreviated overview." With the benefit of their initial study, as well as additional collections from northern México, I have come to a slightly different view of some aspects of the patterns of variability. The 1976 treatment was not radically different in biology from that of Hall (1928), and the present observations can be viewed as an extension of the study of Turner & Hartman. Further information regarding typification and nomenclature can be found in both of these earlier studies.

My observations have primarily involved plants from México, in connection with a treatment of the Asteraceae from that country (Turner & Nesom, in prep.). The morphological delimitation and geographic ranges of two problematic taxonomic groups of the *Machaeranthera pinnatifida* complex have been investigated, (1) var. *pinnatifida* and var. *chihuahuana* Turner & Hartman, and (2) the taxa of Baja California, var. *scabrella* (E. Greene) Turner & Hartman, var. *gooddingii* (A. Nels.) Turner & Hartman, and var. *incisifolia* (I.M. Johnston) Turner & Hartman.

I. *Machaeranthera pinnatifida* varieties *pinnatifida* and *chihuahuana*

In its initial description, *Machaeranthera pinnatifida* var. *chihuahuana* was contrasted with var. *pinnatifida* as having a woodier base and somewhat larger heads on longer, less leafy peduncles. The map provided by Turner & Hartman indicated that the range of var. *chihuahuana* extended from Arizona and Sonora to eastern Durango and northwestern Zacatecas, and annotations of more recent accessions in LL and TEX have further extended its range to Nuevo León and San Luis Potosí, making it nearly completely sympatric in México with var. *pinnatifida*.

Turner & Hartman noted that plants most similar to the type specimen of *Machaeranthera pinnatifida* var. *chihuahuana* are found primarily in northeastern Chihuahua. Even in this area, however, the stem morphology, leaf distribution, and head size are variable, and arbitrary identifications using these features must be made for many specimens over the entire range of the species. Among the plants of *M. pinnatifida* in north central México, however, two taxa do appear to be present, essentially as outlined by Turner & Hartman, but I believe their identifications incorporated an aspect of morphology not explicitly acknowledged in their key or discussion. In the key below, the contrast between var. *pinnatifida* and var. *chihuahuana*, which is based on vestiture, should allow identifications to be made more objectively than in the previous study.

When the collections *Machaeranthera pinnatifida* at LL and TEX are mapped on the basis of this separation, the var. *pinnatifida* is more restricted in México (Figure 1) and the var. *chihuahuana* is more widespread (Figure 2) than previously recognized. Using either the criteria as presented here, or those of Turner & Hartman however, the two taxa appear to be broadly sympatric. Although intermediates appear to be common, there does not appear to be a complete range of intermediacy in vestiture. Rather, most specimens are usually clearly referable to one or the other taxon, implying either that a significant degree of genetic isolation exists between the two or that in plants with a genotype intermediate between glandular and eglandular, one or the other of the vestiture types is produced by rather simple genetic mechanisms. The same degree of broad geographical overlap of the glandular and nonglandular forms occurs in Texas, but the pattern appears more complex there, and detailed evaluation of the infraspecific variation within *M. pinnatifida* north of México awaits future study. The single record of var. *pinnatifida* from Chihuahua (Figure 1) is continuous in distribution with the other similar Mexican plants, through populations that extend from Coahuila northward into trans-Pecos Texas.

Morgan (1990) studied restriction sites in chloroplast DNA in four populations of *Machaeranthera pinnatifida* (two identified as var. *chihuahuana* and

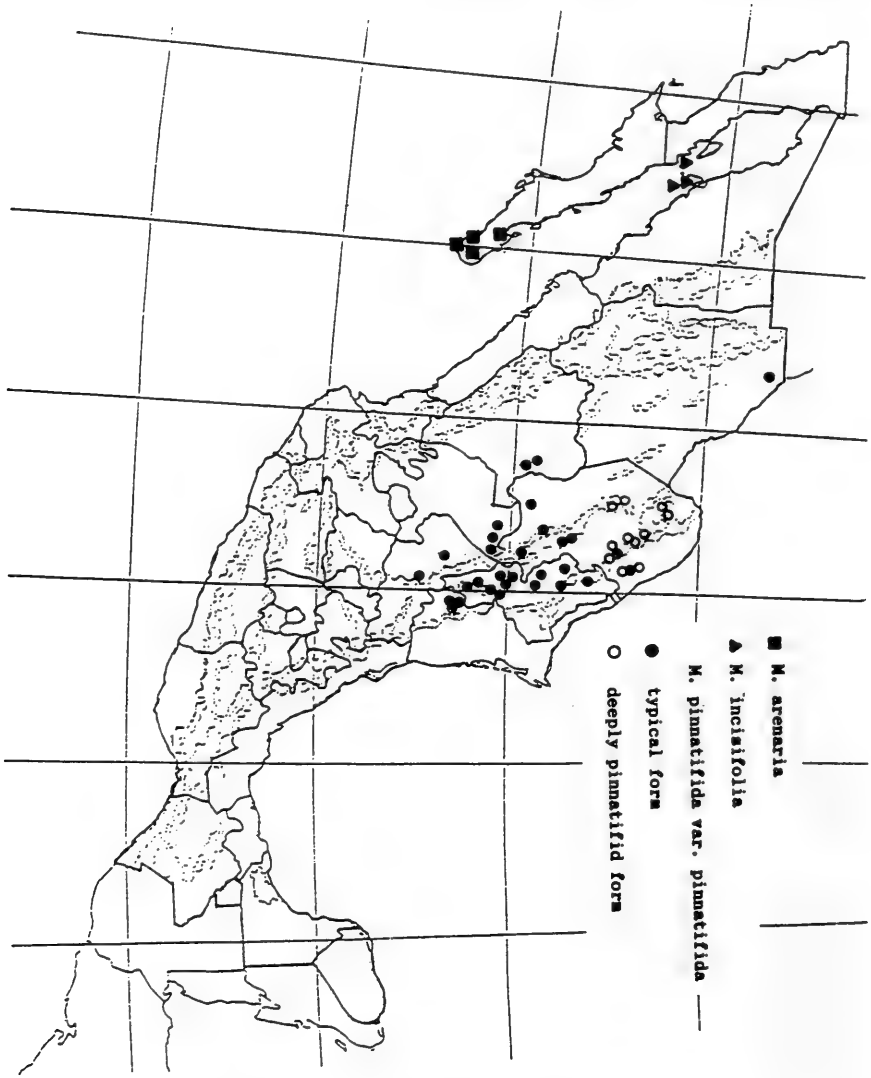

Figure 1. Distribution of *Machaeranthera arenaria*, *M. incisifolia* and *M. pinnatifida* var. *pinnatifida*.

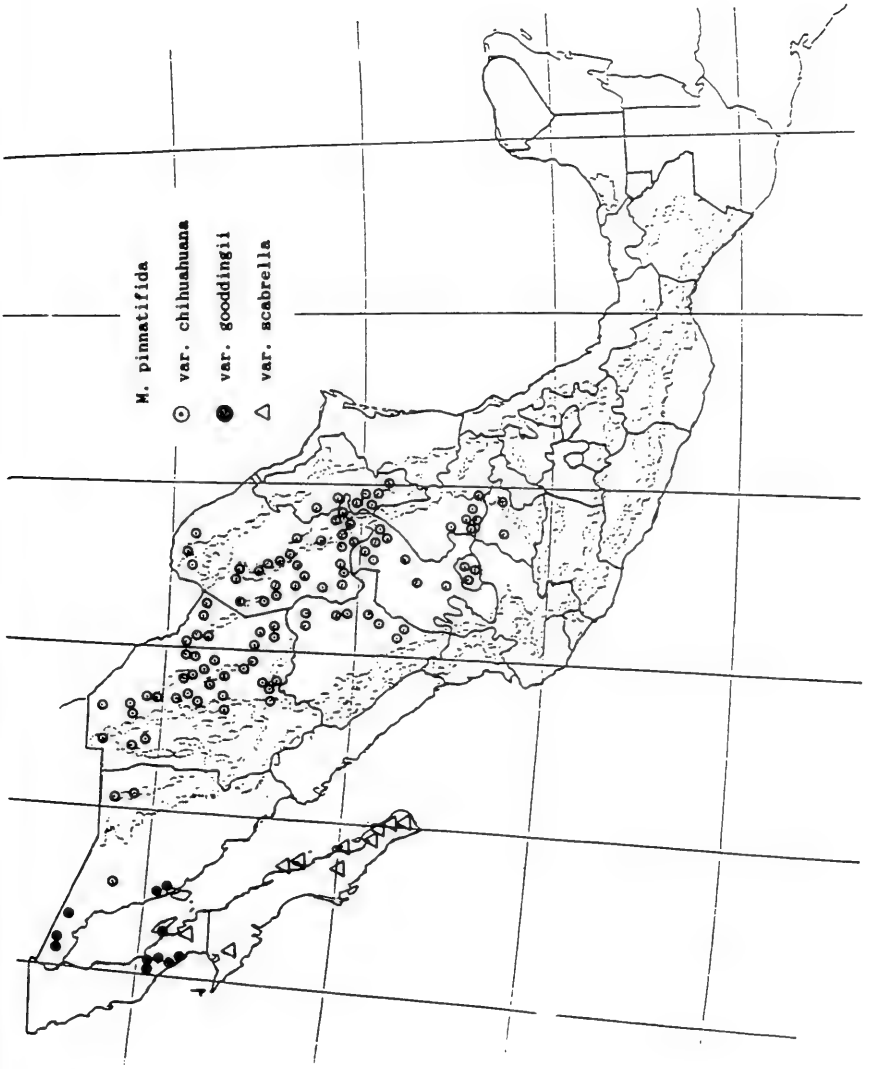

Figure 2. Distribution of *Machaeranthera pinnatifida* vars. *chihuahuana*, *gooddingii*, and *scabrella*.

two as var. *pinnatifida* on the basis of the Turner & Hartman criteria, but all as var. *chihuahuana* on the basis of vestiture type). Morgan's data did not support the earlier classification, although significant variation among the samples is suggestive of the occurrence of regional differentiation within what is referred to here as var. *chihuahuana*.

Among the eglandular plants (var. *pinnatifida*) in México, there is an enclave in northern Coahuila (Figure 1) of variants with highly dissected leaves, which appear to supplant the more typical forms. Individuals with such dissected leaves may also be seen scattered through Texas, although they are much less common there. *Sideranthus cotula* Small (*Haplopappus spinulosus* [Pursh] DC. subsp. *cotula* [Small] Hall) was based on a specimen with highly dissected leaves, but the type collection was made in Oklahoma and the herbage is stipitate glandular. Turner & Hartman considered it to be a synonym of var. *pinnatifida*.

II. The taxa of Baja California

Turner & Hartman recognized three varieties of *Machaeranthera pinnatifida* in Baja California, var. *gooddingii*, var. *incisifolia*, and var. *scabrella*. The plants on Isla San Lorenzo (BC Norte) and nearby islands of Sonora have been included as an infraspecific taxon of both *M. arenaria* and *M. pinnatifida* (var. *incisifolia*, see citations below), but I find no evidence that they intergrade with either species. In contrast, they are geographically distinct and set apart morphologically by the features noted in the short description below, and they are here recognized as a separate species.

Machaeranthera incisifolia (I.M. Johnston) Nesom, *comb. nov.* BASIONYM: *Aplopappus arenarius* Benth. var. *incisifolius* I.M. Johnston. Proc. Calif. Acad. Sci. 4(12):1190. 1924. TYPE: MÉXICO. Baja California Norte: S San Lorenzo Island, 9 May 1921, *I.M. Johnston 3529* (HOLOTYPE: CAS; Isotypes: NY, UC fragment). *Haplopappus spinulosus* (Pursh) DC. subsp. *incisifolius* (I.M. Johnston) Hall, Carnegie Inst. Washington Publ. 389:77. 1928. *Machaeranthera pinnatifida* (Hook.) Shinners var. *incisifolia* (I.M. Johnston) Turner & Hartman, Wrightia 5:315. 1975.

Low subshrubs, often forming clumps to 0.4 cm wide, strongly woody at the base, with slender, ascending, caudexlike branches, sparsely and minutely stipitate glandular, sometimes slightly villous tomentose; leaves mostly basally disposed, obovate in outline, at least the lowermost pinnately lobed, often bipinnatifid; heads 15-20 mm wide, held barely above the level of the leaves, on short, strictly erect, bracteate peduncles.

Baja California Norte on San Lorenzo Island and Sonora on the islands of San Esteban and Tiburón. Plants of *Machaeranthera incisifolia* collected in a variety of habitats, from dunes to cliffs and rocky ridges, maintain their distinctive morphology. As noted by Turner & Hartman, populations cited by Hall (1928) on the islands of San Diego, Santa Cruz, and Coronado in BC Sur are much more similar to *M. pinnatifida* var. *scabrella.*

Turner & Hartman emphasized head size in delimiting two subspecies within *Machaeranthera pinnatifida*, but I have not been able to corroborate this aspect of their taxonomy. Instead, *M. pinnatifida* appears to be set apart in head size from *M. arenaria* and *M. incisifolia*, both of which have larger heads, a similarity also recorded by Ramon (1968). Larger headed (up to 15 mm wide) forms are found scattered in the ranges of vars. *chihuahuana*, *gooddingii*, and *scabrella*, but as noted by Turner & Hartman, the origins of such forms are best regarded as evolutionarily parallel. The nature of the relationship among *M. arenaria, M. incisifolia*, and the Mexican varieties of *M. pinnatifida* is not clear, although it is reasonable to assume that var. *gooddingii* and var. *scabrella*, the two westernmost varieties, are most closely related to each other, as postulated by Turner & Hartman.

There is notable variation among the plants of var. *gooddingii.* Those of Baja California Norte are slightly tomentose but completely eglandular or nearly so, while those of Sonora (including *Sideranthus viridus* Rose & Standl. from the Pinacate Mts.) are sparsely stipitate glandular and have consistently narrower leaves as well. In respect to the vestiture, the latter might be considered intermediate between the peninsular plants of var. *gooddingii* and var. *chihuahuana* of the mainland. The plants of var. *scabrella* are consistently densely glandular, and they appear to be clearly distinguished by vestiture and growth habit from those of var. *gooddingii*, which are contiguous in geographic range.

KEY TO THE VARIETIES OF *MACHAERANTHERA PINNATIFIDA* AND CLOSELY RELATED SPECIES IN MÉXICO

1. Heads 8-15 mm wide, plants from Baja California to Tamaulipas and San Luis Potosí (*M. pinnatifida*) 3

1′ Heads mostly 15-20 mm wide, plants from Baja California and Sonora . 2

2. Leaves mostly basal, lobed, commonly bipinnatifid, sparsely to densely invested with minute stipitate glandular hairs; heads barely above the level of the leaves, on short, strictly erect, bracteate peduncles ..... *M. incisifolia*

2′ Leaves evenly arranged along the stems, shallowly toothed, densely invested with long, stipitate glandular hairs; heads at the ends of ascending to erect ascending peduncles, peduncles leafy to the base of the heads ..... *M. arenaria*

3. Plants eglandular, Coahuila and Nuevo León ..... var. *pinnatifida*

3′ Plants stipitate glandular, widespread, or if eglandular, from Baja California Norte 4

4. Plants densely glandular, stems stiffly erect, branches stiffly spreading-ascending, with leaves even sized and evenly arranged to immediately below the heads, Baja California Sur to Baja California Norte var. *scabrella*

4′ Plants sparsely to densely glandular, stems usually at least slightly arcuate, with leaves reduced in size near the heads, Baja California Norte and Sonora eastward 5

5. Leaf surfaces with a definite shiny texture, sparsely glandular to eglandular, Baja California Norte and western Sonora ..... var. *gooddingii*

5′ Leaf surfaces dull textured, glandular, Sonora to Nuevo León and San Luis Potosí ..... var. *chihuahuana*

ACKNOWLEDGMENTS

I thank Billie Turner and David Morgan for their review and comments.

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A NEW SPECIES OF *GENTIANA* (GENTIANACEAE) FROM DURANGO, MÉXICO

Guy L. Nesom

Department of Botany, University of Texas, Austin, Texas 78713 U.S.A.

ABSTRACT

Gentiana longicollis *sp. nov.*, from southeastern Durango, México, is closely related to *G. ovatiloba* Kusn. and *G. bicuspidata* (G. Don) Briq. of sect. *Pneumonanthe*, but differs from both in its combination of broadly elliptic leaves and its long, erect, merely bracteate peduncles.

KEY WORDS: *Gentiana*, Gentianaceae, México.

A new species of *Gentiana* sect. *Pneumonanthe* from México has been recognized from among recent general acquisitions during curation of Gentianaceae at LL and TEX. The specimen concerned was collected by D.E. Breedlove and distributed as "*Gentiana* cf. *ovatiloba* Kusn.," but while it is similar to that species, as well as *G. bicuspidata* (G. Don) Briq., it is clearly distinguished from them according to the keys, descriptions, and illustrations in the taxonomic treatments of Mexican *Gentiana* by Pringle (1977; 1979). Comparison with a number of LL and TEX specimens of both of its putative relatives confirms its status as a previously undescribed species.

Gentiana longicollis Nesom, *sp. nov.* (Figure 1). TYPE: MÉXICO. Durango: Mpio. Mezquital, near Canoas, meadows with *Pinus* and *Quercus* on surrounding hills, 74 km WNW of Huejuquilla, Jalisco, 2720 m, 22 Oct 1983, *D.E. Breedlove 59178* (HOLOTYPE: TEX!; Isotype: CAS).

Gentiana ovatilobae Kusn. similis sed foliis late ellipticis et pedunculis longis erectis tantum bracteatisque differt.

Roots not seen (but probably taprooted). Stems glabrous, with a leafy, decumbent portion 8-15 cm long, turning upwards and producing a solitary flower on an erect, sparsely bracteate, pedunculiform portion 5-15 cm long. Leaves opposite, slightly succulent, nearly even sized but slightly larger at

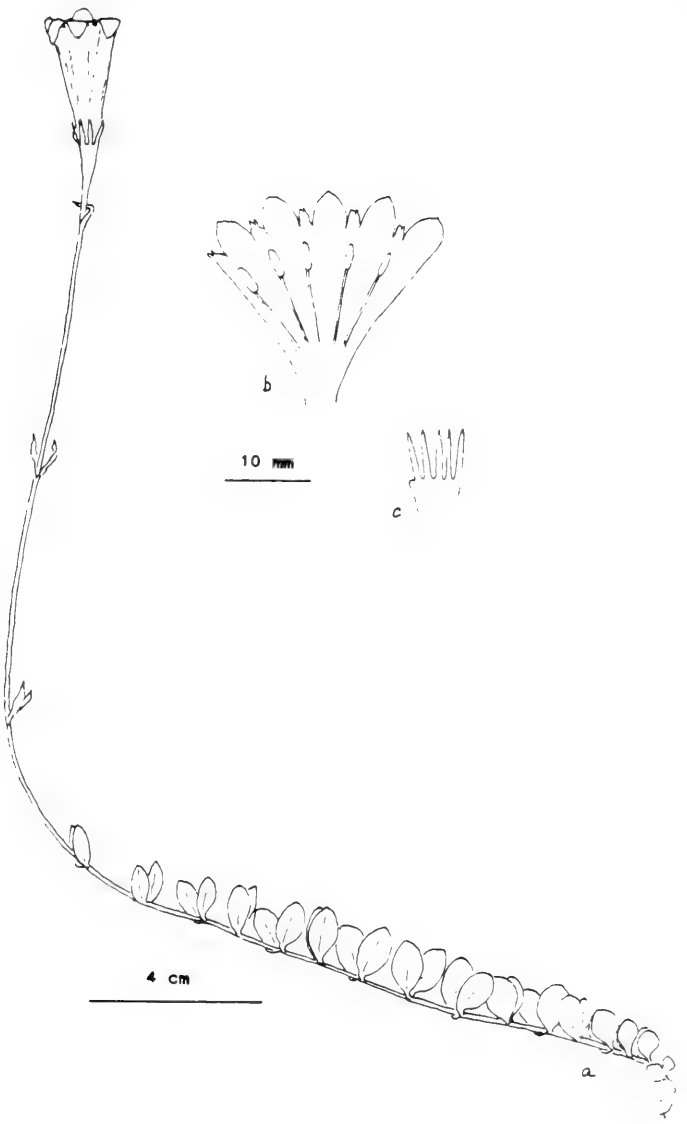

Figure 1. *Gentiana longicollis*. a. habit; b. interior of corolla, opened and flattened; and c. exterior of calyx, opened and flattened.

midstem, evenly and closely spaced, elliptic to broadly elliptic, the largest 9-14 mm long, 7-10 mm wide, 1.2-1.7 times as long as broad, constricted to a subpetiolar base, the apex rounded to obtuse, the margins entire, not thickened or tuberculate papillate, the peduncular bracts lanceolate, 8-10 mm long, in 2-3 pairs 4-6 cm apart. Flowers solitary; calyx purplish, the tube uncleft, 7-8 mm long, glabrous, the lobes erect, narrowly oblong-lanceolate, 5-6 mm long, 1 mm wide, with acute, slightly apiculate apices; corolla 30-35 mm long, the tube funnelform, the lobes spreading, ovate-triangular, 5-6 mm long, with entire margins and obtuse, minutely apiculate apices, the sinuses equal, free portions of the appendages 2-3 mm long, shallowly cleft or bifid; lower 1/3 of the corolla tube pale, the appendages becoming violet-blue upwards, the exterior of the petals distinctly bronzed to nearly the apex, interior lobes of corolla with yellow dots, the lower tube with light yellow stripes with blue dots; stamen filaments becoming free about 1/3 the height of the corolla tube, free portions 11-12 mm long; anthers 3-5 mm long, not cohering. Mature fruit and seeds not seen.

Known only from the type collection.

Gentiana longicollis is clearly most similar to *G. bicuspidata* and *G. ovatiloba* in its unbranched stems bearing solitary, blue flowers with included stamens and corolla tubes gradually flaring from the base (Pringle 1977). The new species is distinguished from both of these taxa by its combination of small, closely spaced, broadly elliptic leaves on decumbent branches and its very long, erect, merely bracteate, pedunculiform branches. It is represented on the type sheet by five separate stems broken off at the very base, but both the habit and duration are almost certainly the same as in *G. ovatiloba*. Both of the close relatives of *G. longicollis* produce stems that usually are leafy to the base of the flower. In its relatively broad, closely spaced leaves, *G. longicollis* is most similar in general aspect to *G. ovatiloba*, but the leaves of the former are definitely shorter (1.2-1.7 times longer than wide vs. 2.5-3.5 times). In its ovate-deltate corolla lobes and nearly linear calyx lobes, yellow spots on the interior of the corolla, relatively longer staminal filaments, its tendency to produce relatively long internodes (over 2 cm on the middle and lower stem), its geographic distribution, and habitats well below alpine and subalpine zones, *G. longicollis* is more similar to *G. bicuspidata*. The linear lanceolate leaves of *G. bicuspidata* are very different, however, and it apparently never has the exaggerated, nearly scapose peduncles of the new species.

Gentiana ovatiloba occurs in alpine to subalpine habitats from Guatemala, northward in México, to the volcanic peaks of Veracruz and the state of México and is separated from *G. longicollis* at the closest point by more than 650 kilometers. The type locality of *G. longicollis* lies within the geographic range of the more widespread *G. bicuspidata*, which occurs in sierran habitats from west central Chihuahua, southward to Veracruz and the state of México, where it is sympatric with *G. ovatiloba*. Pringle (1977) suggested that *G. ovatiloba*,

on the basis of its geographic distribution in the relatively younger volcanic mountains, may be a more recently derived taxon than *G. bicuspidata*. In a group of species otherwise with primarily linear to narrowly lanceolate leaves, the short, elliptic leaves with distinctly thickened and minutely tuberculate papillate margins, characteristic of both *G. ovatiloba* and *G. longicollis* suggest they may have originated as sister taxa, probably from an ancestral lineage of plants similar to *G. bicuspidata*.

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BOTHRIOCHLOA BLADHII (POACEAE) NEW TO LOUISIANA

Paul M. McKenzie, Robert E. Noble,

School of Forestry, Wildlife and Fisheries, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, Louisiana State University, Baton Rouge, Louisiana 70803 U.S.A.

Lowell E. Urbatsch,

Department of Botany, Louisiana State University, Baton Rouge, Louisiana 70803 U.S.A.

&

Donald P. Reed

Louisiana State University, Lee Memorial Forest, Rt. 2, Box 98, Franklinton, Louisiana 70438 U.S.A.

ABSTRACT

The occurrence of *Bothriochloa bladhii* is documented in Louisiana from Iberia, Tangipahoa, and Washington parishes.

KEY WORDS: Floristics, *Bothriochloa*, Poaceae, systematics, Louisiana.

Bothriochloa bladhii (Retz.) S.T. Blake, commonly called Australian bluestem, is native to tropical-subtropical Africa, Asia, Australia, and islands of the Pacific (Blake 1969; Gould 1975). It was introduced into the New World as a forage grass (Gould 1975; 1979) and has become naturalized along roadsides in southern Texas (Gould 1975). The species is an excellent fodder grass in Australia (Blake 1944). *Bothriochloa bladhii* is not reported in Allen (1980), and MacRoberts (1988) stated that he "found no report of the species in Louisiana."

The first record for Louisiana is based on a collection in Iberia Parish, ca. 1 mile south of the Iberia Research Station, along a railroad right of way that parallels Louisiana Route 182, 20 November 1981 (*Saichuck s.n.* [LAF]). A second collection was made in Washington Parish, along Louisiana Highway

16, ca. 200 meters east of the Techefuncte River bridge near the Tangipahoa Parish line, 17 October 1986 (*L. Smith 1487* [LSU]). The latter specimen, however, was reported erroneously as *B. pertusa* (L.) A. Camus (McKenzie, *et al.* 1988). A third record for *B. bladhii* was collected on Lee Memorial Forest, Washington Parish, 13 September 1989 (*McKenzie 1070* with Lowell E. Urbatsch and Robert E. Noble [LSU]). A fourth collection was secured in Tangipahoa Parish, along Louisiana Highway 16, ca. 1 mile west of the parish line near the 1986 locality, 12 October 1989 (*McKenzie 1074* with Robert E. Noble: [FLAS, K, LSU, MO, NMCR, TAES]). A final collection was made on Lee Memorial Forest on 26 June 1990 (*McKenzie 1081* with Robert E. Noble [LSU]).

All specimens from Tangipahoa Parish and Washington Parish had spikelets that averaged smaller (ca. 3.2 mm) than typically reported for this species (3.5-4.0 mm, [Gould 1975]). These measurements may represent unusual variations in length as discussed by Blake (1944) or indicate that material from eastern Louisiana represents an introgressive hybrid between *Bothriochloa bladhii* and *Capillipedium parviflorum* (R. Br.) Stapf, as reported by Harlan, *et al.* (1958), de Wet, *et al.* (1961), and Blake (1969). The introduction of Australian bluestem in Louisiana appears to be unintentional, and Experiment Station personnel in Iberia and Washington parishes have no records of *B. bladhii* being introduced as a forage species.

ACKNOWLEDGMENTS

We thank the curators of the following herbaria for their assistance with this report and in confirming the identification of specimens: FLAS, K, LAF, NMCR, TAES. We are grateful to Dr. Charles Allen and Dr. R. Dale Thomas for reviewing the paper and to Dr. Peter Michael, 5 George St., Epping, NSW 2121, Australia, for his assistance. Approved for publication by the Director of the Louisiana Agricultural Experiment Station as manuscript number 90-22-4366.

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TWO NEW SPECIES OF *EUPATORIUM* (ASTERACEAE: EUPATORIEAE) FROM CHIAPAS, MÉXICO

B.L. Turner

Department of Botany, University of Texas, Austin, Texas 78713 U.S.A.

ABSTRACT

Two new shrubby species of *Eupatorium* from Chiapas, México, are described: **E. heathiae** *sp. nov.* and **E. siltepecanum** *sp. nov.* The former is believed to relate to the *Kyrsteniopsis* group of *Eupatorium* and the latter to the *Critonia* group, but both are only remotely related to any of the known species of México.

KEY WORDS: *Critonia, Eupatorium, Kyrsteniopsis*, Asteraceae, Eupatorieae, México.

Routine identification of Mexican Asteraceae has revealed the following new species in *Eupatorium.*

Eupatorium heathiae B. Turner, *sp. nov.* TYPE: MEXICO. Chiapas: Mpio. Mapastepec, Reserva El Triunfo, buffer zone, El Limonar-El Paval (15° 39′ N, 92° 48′ W), 1200 m, 19 Jun 1990, disturbed area in Montane/Evergreen seasonal forest, *M. Heath & A. Long 1128* (HOLOTYPE: TEX!; Isotype: CHIP).

Eupatorium nelsonii B.L. Robins. similis sed capituliis cylindricis flosculos tantum 4 (vs. 8-10) contentibus differt.

Shrubs to 2 m high. Stems terete, densely hirsutulous, glabrate and corky with age. Leaves opposite throughout, 7-13 cm long, 3-6 cm wide; petioles 1.5-3.0 cm long; blades broadly ovate, palmately 3-5 nervate, glabrate above and below except along the major veins, the lower surfaces markedly glandular punctate, the margins serrulate. Heads numerous in terminal, somewhat rounded, congested cymose panicles, ca. 10 cm wide and 6 cm high, the ultimate peduncles mostly 0-2 mm long. Involucres cylindrical, the bracts persistent, 3-4 seriate, markedly graduate, broadly ovate to linear lanceolate, 3-5

striate, glabrous and brownish colored (except for the outermost bracts). Receptales plane, glabrous. Florets 4 per head, the corollas tubular, reportedly white, ca. 4 mm long, the lobes ca. 0.3 mm long. Anther appendages longer than wide. Style with base of shaft glabrous and not enlarged, the stylar branches linear but with a slight gradual enlargement apically. Achenes ca. 2 mm long, 5 ribbed, sparsely pubescent, the carpopodium grading into the ribs, the pappus of 40-50 persistent bristles 4-5 mm long.

Eupatorium heathiae belongs to the *Kyrsteniopsis* group of *Eupatorium* s.l. and would key to or near that genus in the treatment of the Mexican genera as circumscribed by King & Robinson (1987). Superficially, the species appears to belong to the *Critonia* group but the glandular punctate undersurfaces of the leaves preclude a position there.

Eupatorium siltepecanum B. Turner, *sp. nov.* TYPE: MÉXICO. Chiapas: Cascada, near Siltepec, in advanced forest, 1600 m, 1 Mar 1945, *Eizi Matuda 5156* (HOLOTYPE: LL!; Isotypes: LL!, MEXU).

Eupatorium microdoni B.L. Robins. similis sed foliis tenuioribus latioribusque marginibus dentatis et capitulis numerosioribus receptaculis hemisphaericis pubescentibusque differt.

Shrub. Stems terete, densely brown hirsute. Leaves opposite throughout, 10-20 cm long, 5-8 cm wide; petioles 1.5-5.0 cm long; blades ovate elliptic to elliptic, broadest at or near the middle, pinnately nervate, glabrate above, pubescent beneath along the principal veins, both surfaces abundantly endowed with pustulate blisters, the margins serrulate. Heads numerous, borne in a terminal ovoid capitulescence, arranged in corymbose panicles, the ultimate peduncles mostly 0-1 mm long. Involucres campanulate, ca. 4 mm high, the bracts 2-3 seriate, the inner series readily detaching. Receptacle hemispheric, ca. 1 mm across, 0.5 mm high, alveolate, pubescent. Florets 10-12 per head, the corollas rose colored, tubular, ca. 3 mm long, glabrous, except for the sparsely pubescent lobes, the latter ca. 0.7 mm long. Anther appendages ca. as long as wide. Style with shaft glabrous, not enlarged at the base, the branches linear, scarcely enlarged apically. Achenes ca. 1.5 mm long, 5 ribbed, sparsely hispid, the carpopodium distinct but poorly developed, scarcely merging into the ribs, the pappus of ca. 50 slender persistent bristles 3-4 mm long.

Additional Specimen Examined: MÉXICO. Chiapas: Cascada, Siltepec, 1600 m, 1 Mar 1945, *Matuda 5164* (F, MEXU).

While compared to *Eupatorium microdon* in the above diagnosis, *E. siltepecanum* does not appear to be especially close to that species. Indeed, it appears to stand somewhere within the *Decachaeta* - *Bartlettina* - *Critonia* complex, *sensu* King & Robinson (1987), possessing many of the characters of *Bartlettina* and *Decachaeta* (e.g., hemispheric pubescent receptacles). I have

referred it to the *Critonia* complex, however, largely because it possesses pustulate glands on the leaf surfaces, a character that apparently distinguishes the *Critonia* group (King & Robinson, 1987; Whittemore, 1987).

ACKNOWLEDGMENTS

Guy Nesom provided the Latin diagnosis and I am grateful to him and T.P. Ramamoorthy for reviewing the manuscript.

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TWO NEW SPECIES OF *VERBESINA* (ASTERACEAE, HELIANTHEAE) FROM MÉXICO

B.L. Turner

Department of Botany, University of Texas, Austin, Texas 78713 U.S.A.

ABSTRACT

Two new species of *Verbesina* from México are described: **V. paneroi** *sp. nov.* from Volcán Colima, Jalisco, and **V. villasenorii** from western Oaxaca. The former is seemingly related to *V. klattii* B.L. Robins. & Greenm. and *V. furfuracea* McVaugh, the latter to *V. grayi* (Schultz-Bip.) Hemsl. An illustration is provided for *V. paneroi.*

KEY WORDS: *Verbesina*, Asteraceae, Heliantheae, México, systematics.

Routine identification of Mexican Asteraceae has revealed the following novelties in *Verbesina.* These were sent to me by Dr. José L. Panero, who asked that I note here that the collections were assembled through support of N.S.F. grant BSR 8806513 to Dr. Ed Schilling of the University of Tennessee.

Verbesina paneroi B. Turner, *sp. nov.* Figure 1. TYPE: MÉXICO. Jalisco: 20-25 km from El Fresnito along the road to the summit of Volcán Colima, 2300-2500 m, 27 Dec 1989, *José L. Panero, José L. Villaseñor & A. Ramos 1841* (HOLOTYPE: TEX!; Isotypes: MEXU, TENN).

Verbesina klattii B.L. Robins. & Greenm. similis sed capitulis 18 vel plus in panicula laxa ac corymboidea dispositis et involucri bracteis ovatilanceolatis adpressis valde imbricatisque (vs. late foliaceisac incohaerentibus) differt.

Open shrubs 3-4 m high. Stems markedly winged, hispidulo-puberulous. Leaves opposite throughout, the larger up to 35 cm long and 25 cm wide, broadly ovate in outline, markedly trilobate, the major lobes with broad shallow lobes; petioles ca. 10 cm long, broadly winged throughout; blades evenly hispid above and below, with erect or ascending hairs. Heads ca. 18, radiate,

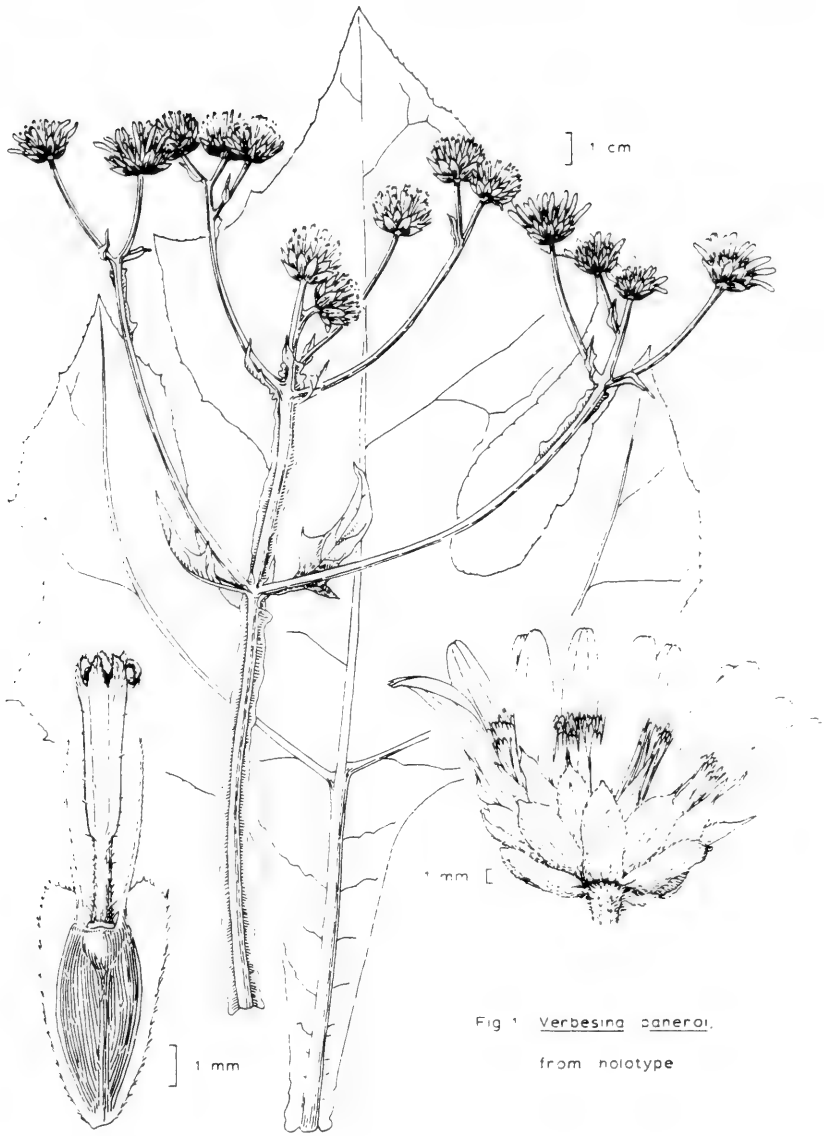

Fig 1 Verbesina panerol, from holotype

arranged in a broad, open, relatively naked corymbose panicle ca. 18 cm high and 20 cm wide, the ultimate peduncles unwinged, mostly 1-5 cm long. Involucres campanulate, 12-14 mm high, ca. 20 mm wide (pressed), ca. 4 seriate, the bracts mostly ovate lanceolate, appressed, moderately appressed pubescent, grading into the linear lanceolate pales, the latter shorter than the subtending florets. Ray florets 13-18, pistillate, fertile, the ligules golden yellow, 10-14 mm long, ca. 4 mm wide, the tube pubescent. Disc florets numerous, the corollas golden yellow, 7-9 mm long, pubescent throughout, the tubes and lobes especially so, the latter ca. 1.5 mm long. Achenes (somewhat immature) ca. 6 mm long, 3 mm wide, winged along the upper shoulders, glabrous or nearly so, the pappus of 2 persistent, sparsely ciliate awns 4-5 mm long.

Verbesina paneroi appears related to *V. furfuracea* McVaugh (sect. *Pseudomontanoa* [Turner 1985]), a species with alternate, nondecurrent leaves, but it appears equally close to *V. klattii* (sect. *Pterodophyta* [Robinson & Greenman 1899]) having the capitulescence and heads of the former and the opposite, markedly decurrent leaves of the latter.

It is a pleasure to name this striking species for its principal collector, Dr. José Panero, currently working out of the University of Tennessee, an expert on the difficult genus *Viguiera* and related groups.

Verbesina villasenorii B. Turner, *sp. nov.* TYPE: MÉXICO. Oaxaca: 31 km S of Tlaxiaco on road to San Miguel Yosondua; occasional in cool pine-oak and *Cornus* forest, 2500 m, 19 Dec 1989, *José L. Panero, José L. Villaseñor & A. Ramos 1809* (HOLOTYPE: TEX!; Isotypes: MEXU, TENN).

Verbesina grayi (Schultz-Bip.) Hemsl. similis sed foliis alternis in caulibus superis (vs. omnino oppositis) crassioribus brevioribusque et capituliis paucioribus in pedunculis ultimis longioribus (2-9 cm longis vs. 0.5-2.0 cm longis) differt.

Profusely branched shrub to 1 m high; stems unwinged, densely strigose. Leaves alternate above or nearly opposite throughout, those at midstem 4-6 cm long, 1.3-2.0 cm wide; petioles 2-5 mm long; blades ovate to elliptical, pinnately veined, densely and softly sericeous beneath, the surface atomiferous glandular, the margins serrulate to nearly entire; heads eradiate, 5-8 per main stem, the ultimate peduncles 2-9 cm long; involucres campanulate, 6-8 mm high, 9-11 mm wide, the bracts 3-4 seriate, sericeous, subequal, the outer series oblanceolate to somewhat spatulate, grading into the pales, the latter with erect yellow acute glabrous apices. Florets numerous (60+), the corollas ca. 4 mm long, pubescent throughout with sericeous hairs, the tube ca. 1.5 mm long; achenes (immature) ca. 3 mm long, sparsely pubescent, the pappus of 2 readily deciduous, nearly eciliate awns ca. 2.5 mm long.

Verbesina villasenorii superficially resembles *V. grayi*, especially those populational forms of the latter from the states of México and Michoacán with eradiate heads. Rzedowski (1980) applied the name *V. discoidea* (Brandegee) Rzed. to the latter populations, but I treat these (Turner, in prep.) as part of the earlier, widespread, highly variable *V. grayi* (including *V. heterocarpa* S.F. Blake). McVaugh (1984) maintained both *V. discoidea* and *V. heterocarpa* but failed to account for *V. grayi*; Rzedowski (1980) treated *V. heterocarpa* as synonymous with *V. discoidea*, but did not note their close relationship with *V. grayi*.

It is a pleasure to name the present novelty for José Villaseñor, one of the most promising synantherologists of México, currently working for his doctorate degree at Pomona, California.

ACKNOWLEDGMENTS

Nancy Webber provided the illustration. I am grateful to Guy Nesom for the Latin diagnosis and to him and T.P. Ramamoorthy for reviewing the manuscript.

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